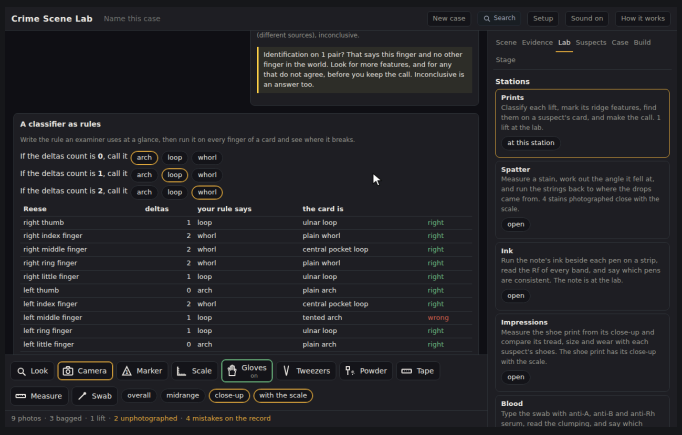
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Crime Scene Lab: Fingerprints, Classify, Compare, Call It

Grades 6-12 · 45 minutes

Forensic science · Biology



Slides, rubric and answer key **Print and go** **No student accounts**

Chromebook friendly

What's included

- A one-page overview: objectives, essential question, vocabulary, standards and assessment
- A 45-minute lesson sequence: warm-up, direct instruction, guided practice, independent practice, closure
- Slides for the board: a PowerPoint file that also opens in Google Slides
- A student worksheet with a QR code and a comparison table
- A 3-question exit ticket, two to a page, with an answer key
- A rubric: 3 criteria, 4 levels, scored out of 12
- Differentiation for English learners, students with IEPs or 504 plans, and students who need more support or more challenge
- Cross-curricular extensions, and notes for teaching it in grades 6 to 8 and in a college introductory course
- Standards: Common Core ELA

Crime Scene Lab: Fingerprints, Classify, Compare, Call It

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Two prints have already been lifted from the broken pane and sent to the lab. Students classify each by counting its deltas, mark the ridge features they can see, pick a suspect and a finger, find the same features on the card and pair them, and make the call in the words an examiner uses. One lift is clean; the other is small and smudged, and it may never give enough. Then they write the classifier as three rules and run it on a whole card to see where it breaks.

At a glance

ESSENTIAL QUESTION

How many matching features make a fingerprint match?

OBJECTIVES

Students will be able to:

- classify a print as an arch, a loop or a whorl by counting its deltas, and at high school name its class in the eight-class scheme
- mark ridge endings, bifurcations and dots on a lift and find the same features on a card
- make the examiner's call, identification, exclusion or inconclusive, and say why no fixed number of points makes a match
- write a classifier as rules and say where it breaks

VOCABULARY

Delta, Core, Ridge ending, Bifurcation, Identification, exclusion, inconclusive

STANDARDS

W.9-10.1b

TIME AND MATERIALS

45 minutes, grades 6-12.

- One computer or Chromebook per student
- A projector
- The worksheet and exit ticket, one copy each per student
- The rubric, one copy per student if you grade the work

PREP

Make copies of the worksheet and exit ticket. Before class, open mytekdev.com/try/crimescenelab?lesson=fingerprints-classify-compare-call&ref=tpt-crimescenelab-2 once on a student computer: it opens with two lifts already at the lab, and checks that your school's filter allows the app. Compare the clean lift yourself once, about five minutes, so you know the pairing: press a mark on the lift, then the same feature on the card.

ASSESSMENT

- Formative: the questions under What to look for, asked while students work, and the exit ticket (answer key included).
- Summative: the worksheet's comparison table and the call with its reason, scored with the rubric.

TECHNOLOGY AND PRIVACY

Runs in any browser, Chromebooks included, with nothing to install. Students need no account and no email: the link works signed out, and nothing they do is stored on our server unless they choose to save. The case, the people, the prints and the inks are invented.

Lesson sequence

MINUTES	STAGE	WHAT YOU DO	WHAT STUDENTS DO
0 to 5	**Warm-up** Hook	Show the title, essential question and Today I can slides (about 1 minute). Then the warm-up: is there a number of points that makes a match? Take a vote on twelve, eight, sixteen, and write the tally on the board.	Answer the warm-up on the worksheet: a number, or none, and why.
5 to 12	**Direct instruction (I do)** Model it	Show Three classes, by the deltas. Project the app with the starter open, Lab tab, Prints station. On lift 1 count the deltas aloud and press the class chip. Press a ridge ending on the lift: a mark. Pick a suspect, press the right index thumbnail, press the same feature on the big card: a pair, numbered. Show What an examiner does. **It's working when:** Pick the wrong suspect first on purpose and show that nothing on the card lines up. The lift is a real finger seen through tape; the wrong finger never fits.	Watch, and fill in the vocabulary on the worksheet.
12 to 22	**Guided practice (We do)** Lift 1 together	Have students open the link or scan the QR code. Together: the Lab tab, the Prints station, the deltas of lift 1, its class, three marks on the lift, a suspect and a finger, three pairs. Check that every student's station reads 3 matching features before moving on. **Watch for:** Students who mark the card first and then hunt on the lift. Either order pairs, but the lift is the question and the card is the answer sheet.	Classify lift 1, mark three features, pair them on the card, and write the class and the pairs in the worksheet's table.
22 to 38	**Independent practice (You do)** Lift 2, and the rules	Students work lift 2, the smudged one, on their own: classify it if they can, mark what they can find, compare it with two fingers, make the call and write why. Then the rules pane at the bottom of the station: three rules, run on a card. Walk the room with the What to look for questions. **If they ask:** "You found two pairs on lift 2 and called it an identification. What would an examiner say to two?" The call	Work lift 2 and fill in the second row of the table with the call and its reason. Write the three rules and run them on two cards; note the finger where a rule breaks.
38 to 45	**Closure** Showcase and exit ticket	Show the Showcase slide. Two students explain their call on lift 2. Return to the warm-up tally: the answer to the essential question is that there is no number. Hand out the exit ticket.	Answer the exit ticket.

Before you teach: a ten-minute walkthrough

Open mytekdev.com/try/crimescenelab?lesson=fingerprints-classify-compare-call&ref=tpt-crimescenelab-2. A short guide opens over the app. Two prints have already been powdered, taped and sent from the broken pane: lift 1, clean, and lift 2, small and smudged where the brush went twice. The scene is otherwise untouched.

1. **Classify.** `Lab` tab, `Prints` station. Count lift 1's deltas and press a chip: at high school the eight classes, at middle school three. The chips record the choice; nothing says whether it is right until the case is handed in.
2. **Mark and pair.** Press `ridge ending`, then press one on the lift: a mark. Pick a suspect; the ten thumbnails are their card. Press a finger, then press the same feature on the big card: a numbered pair. The station counts the pairs.
3. **Call it.** `identification`, `exclusion` or `inconclusive`. An identification on two pairs is accepted and the chip for the Case says `2 points`, which is the lesson.
4. **The rules.** Under the comparison: three rules, if the deltas count is 0, 1, 2. Run them on a card and the table shows every finger, the rule's call, the card's true class, and where it broke.

> The moment that lands is the wrong finger. The lift is the suspect's actual finger seen through the tape, so on the right finger every feature lines up and on any other finger nothing does.

Background for the teacher

Prints are classified by their pattern. A loop has one delta and a core; a whorl has at least two deltas; a plain arch has none. About 65 percent of prints are loops and about 30 percent whorls, the figures in the FBI's own manual; measured populations vary. The eight classes of the standard scheme are the plain arch, tented arch, radial loop, ulnar loop, plain whorl, central pocket loop, double loop and accidental. The tented arch is the one that breaks a rule by deltas: it has a delta and is still an arch.

A comparison is ACE-V: analysis of the lift, comparison with the known print, evaluation to a call, and verification by a second examiner. The three calls are identification (the same source), exclusion (different sources) and inconclusive. There is no fixed number of matching points in the United States; the examiner weighs the quality and the quantity of the features, and a partial or smudged lift may never give enough. The app never counts points as a score, and the chip it hands to the Case says the count so the teacher can see it.

Common mistakes: calling an identification on two or three pairs; pairing a feature on the lift with a different kind of feature on the card; skipping the smudged lift's inconclusive because it feels like failing. The last question on the handout asks the number question straight.

What to look for

Ask these while students work. A student who has understood the lesson can answer them without help:

- Point to the delta on lift 1. What class does that make it?

- You paired a ridge ending with a bifurcation. Are those the same feature?
- How many pairs did you find on lift 2, and is that enough?
- What are the three calls, and which one is the honest one for a smudged lift?
- Your rule says one delta is a loop. On which finger did it break, and why?

> The last question is the real test: anyone who says the tented arch has a delta and is still an arch, so counting deltas sorts most prints and not all, has understood what a rule is.

Cross-curricular extensions

- Math: the FBI's figures are 65 percent loops and 30 percent whorls. On the four cards, count the loops and whorls across forty fingers and compare the share.
- History: find when fingerprints were first used in a criminal case in your country, and what classification system was used.
- English: write lift 2's comparison as an examiner's report: the lift, the features, the finger, the call, and the reason.
- Computer science: the rules pane is a classifier. Write a fourth rule that catches the tented arch, and say what it needs that counting deltas does not give.

Vocabulary

Delta	The point where ridges from three directions meet, like a river delta. A loop has one; a whorl has at least two; a plain arch has none.
Core	The approximate center of the print.
Ridge ending	A ridge that stops.
Bifurcation	A ridge that forks into two.
Identification, exclusion, inconclusive	The examiner's three calls: the same source, different sources, or not enough to say.

Differentiation

ENGLISH LEARNERS

- Keep the vocabulary slide up with the five terms and the picture of a loop beside them.
- Pair each learner with a partner for lift 1; the features are shapes, and the pairing is pressing the same shape twice.
- Accept the worksheet's call as a circled chip name and the reason as a count.

STUDENTS WITH IEPS OR 504 PLANS

- Pair students for lift 2, one finding features on the lift and one on the card.
- Zoom the browser to 150%: the lift and the card stay readable, and the thumbnails grow.
- Allow lift 1 alone, compared with one finger, where the IEP allows a modified assignment.

STUDENTS WHO NEED MORE SUPPORT

- A sentence starter for the call: 'I called it ___ because I found ___ pairs and the lift is ___.'
- A check-in after lift 1: every student has three pairs before anyone opens lift 2.
- Skip the rules pane; the classification by deltas is the extension.

STUDENTS READY FOR MORE

- Compare lift 2 with all ten fingers of the right suspect and write which ones can be excluded outright and why.
- Run the rules on all four cards and name every finger where they break, with its true class.
- Open the ten-print card of the custodian and say why a print on the pane can be theirs and still mean nothing.

Adapting for other grades

Younger students: In grades 6 to 8, open Setup and pick middle school: three classes, arch, loop and whorl. Do lift 1 together and lift 2 with a partner; drop the rules pane and the third rubric row; total 8, and 6 meets the objectives.

Older students: In a college introductory course, require the eight-class name for both lifts and a written comparison of lift 2 against two fingers with every pair justified, and read ACE-V's verification step: a second student checks the call.

Student worksheet

Name: _____ Date: _____

Open the app: scan the QR code, or go to mytekdev.com/try/crimescenelab?lesson=fingerprints-classify-compare-call

Essential question: How many matching features make a fingerprint match?

Warm-up: Is there a number of points that makes a match? My answer: _____. Because: _____.

1. **Vocabulary.** Delta, core, ridge ending, bifurcation, the three calls: write each in your own words.

2. **The comparison table.** For each lift: deltas counted ____; class _____; suspect and finger compared _____; pairs found ____; the call _____; the reason _____. Lift 1 on the first line, lift 2 on the second.

3. **The rules.** 0 deltas → _____. 1 delta → _____. 2 deltas → _____. The card I ran them on: _____. The finger where a rule broke, and its true class: _____.

1. Lift 2 is smudged. Which call did you make, and what would an examiner say about the number of pairs you found?

2. Counting deltas sorts most prints. Which class breaks the rule, and why?

Crime Scene Lab: Fingerprints, Classify, Compare, Call It

Exit ticket

Name: _____

1. A print with one delta and a core is: (A) an arch (B) a loop (C) a whorl

2. In the United States, the number of matching points an examiner needs for an identification is: (A) 8 (B) 12 (C) there is no fixed number

3. Name the three calls an examiner can make, and say which one fits a smudged partial lift with two pairs.

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Answer key: exit ticket

QUESTION	ANSWER	WHY
1	B	A loop has one delta and a core; a whorl has at least two deltas; a plain arch has none.
2	C	There is no fixed number of points. The examiner weighs the quality and the number of corresponding features.
3	Identification, exclusion, inconclusive; inconclusive	Two pairs on a smudged partial is not enough to say the same source or a different one. Three calls named with the right one chosen is a full answer; three named alone is half.

Rubric

Score each row from 1 to 4.

Name: _____

CRITERIA	4 EXCEEDS	3 MEETS	2 APPROACHING	1 BEGINNING
Classification	Both lifts classified by their deltas, with the delta count written and the eight-class name at high school.	Both lifts classified; the delta count written for one.	One lift classified correctly.	Neither lift classified, or classes guessed without deltas.
The comparison	Pairs marked on the right finger for lift 1 and the smudged lift worked against two fingers, with the pairs on real features.	Pairs marked on the right finger for lift 1; lift 2 compared with one finger.	Pairs marked on lift 1 against a wrong finger, or marks on the lift with no pairs.	No pairs marked.
The call	Both calls made in the examiner's words with a reason, and the smudged lift called inconclusive with why.	Both calls made with a reason.	A call made with no reason, or an identification on two pairs.	No call made.

Total: ____ / 12. A score of 9 or more meets the objectives.

Standards

No national standard covers forensics. The Common Core writing standard fits the call with its reason and the limits the student has to name. The NGSS practices the lesson uses are named here and will be tagged when their text is read.

FRAMEWORK	CODE	GRADES	STANDARD	HOW THE LESSON MEETS IT
Common Core ELA	**W.9-10.1b**	9-10	Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns.	The call is a claim; the pairs are its evidence; the smudge and the count are its limitations, which the worksheet asks the student to point out.

Checked October 2026 against: Common Core State Standards, Writing, Grades 9-10.

Optional: save student work in a free class

The whole lesson runs at the link on the worksheet, with no accounts and no sign-up.

To keep students' cases, and see them all in one place, make a free class. It takes about ten minutes, once, and covers every lesson in this series: mytekdev.com/tools/class-setup

Students in a class open mytekdev.com/tools/crime-scene-lab/lessons/fingerprints-classify-compare-call/start instead of the worksheet link. Each one gets their own copy of the starter, and the same link reopens it next time.

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