Fingerprints

1. Fingerprint Principles

According to criminal investigators, fingerprints follow 3 fundamental principles:

1. A fingerprint is an _____ characteristic; no two people have been found with the _____ same fingerprint pattern.

2. A fingerprint pattern will remain _____ for the _____ of an individual.

3. Fingerprints have general characteristic _____ patterns that allow them to be systematically identified.

2. Fingerprint Classes

There are 3 specific classes for all fingerprints based upon their visual _____ arches, loops, and whorls. Each group is divided into smaller groups as seen in the list below.

_____	_____	_____	Loops = _____
Plain	Radial	Plain	
Tented	Ulnar	Central pocket	Whorls = _____
		Double loop	
		Accidentical	Arches = _____

3. Examples

Arches are the simplest type of fingerprints that are formed by ridges that enter on one _____ of the print and exit on the _____. No _____ are present.

| _____ **Arch** Ridges enter on one side and exit on the other side.	_____ **Arches** Similar to the plain arch, but has a spike in the center.

Loops must have one _____ and one or more _____ that enter and leave on the same side. These patterns are named for their positions related to the _____ and _____ bones.

_____ **Loop** Loop opens toward the thumb or radius bone on the right hand.		_____ **Loop** Loop opens toward the little finger or the ulna bone on the right hand.

Whorls have at least one _____ that makes (or tends to make) a complete _____ They also have at least _____ deltas. If a print has more than two deltas, it is most likely an _____

Draw a line between the two deltas in the plain and central pocket whorls shown below. If some of the curved ridges touch the line, it is a plain whorl. If none of the center core touches the line, it is a central pocket whorl. Label each fingerprint below.
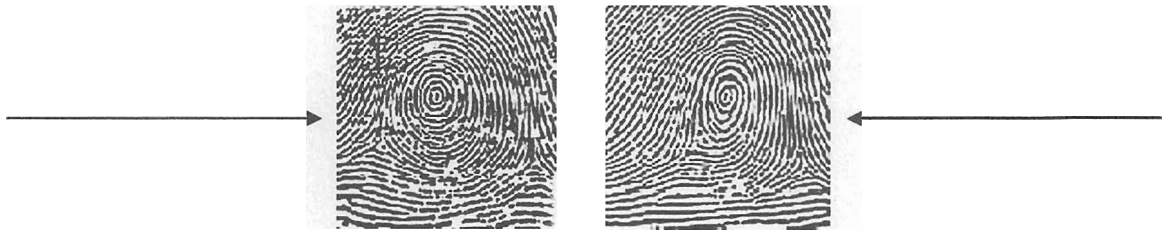
_____ _____ whorls are made up of any two loops combined into one print.

_____ whorls contain two or more patterns (not including the plain arch), or does not clearly fall under any of the other categories.

4. Identify each fingerprint pattern shown on the class notes.

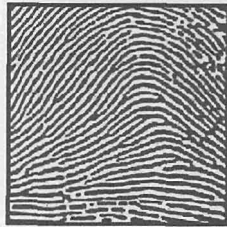A. _____   C. _____   D. _____

B. _____   E. _____

5. Follow your teacher's directions to document your fingerprints on the My Prints worksheet. Use your notes and a magnifying glass to identify the pattern in each one.

Fingerprint Ridge Patterns

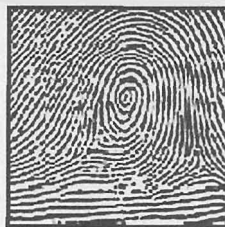## Arches

Plain Arch

Tented Arch

Loops

Right Hand

Radial Arch

Ulnar Arch

Whorls

Plain Whorl
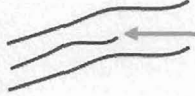

Central Pocket Whorl

Double Loop

Accidental

Fingerprint Ridge Characteristics

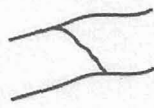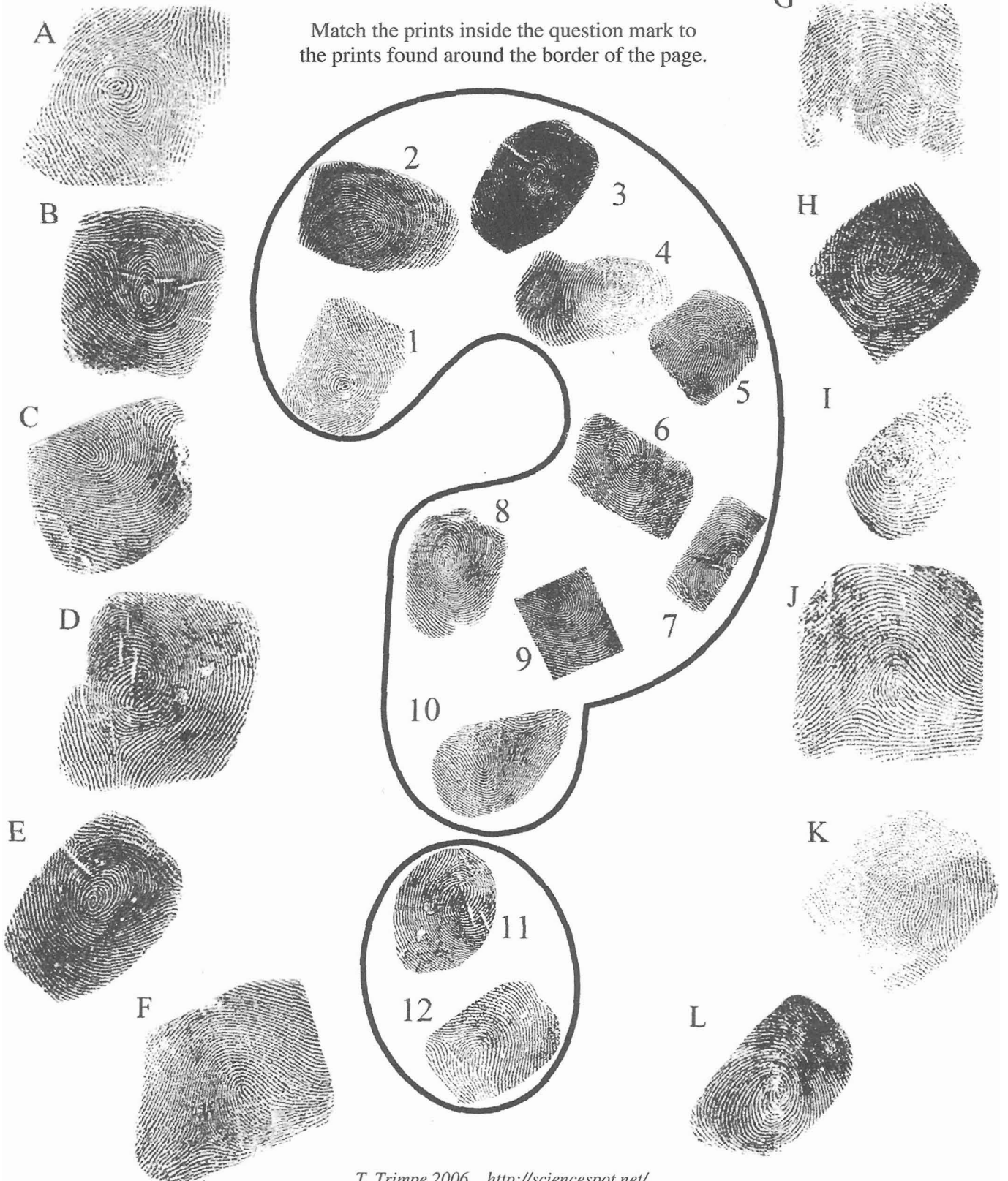|			
Core	Ending Ridge	Short Ridge	Fork or Bifurcation
Delta	Hook	Eye	Dot or Island
Crossover	Bridge	Enclosures	Specialty

Fingerprint Challenge

Match the prints inside the question mark to the prints found around the border of the page.

A

B

C

D

E

F

G

H

I

J

K

L

1
2
3
4
5
6
7
8
9
10
11
12
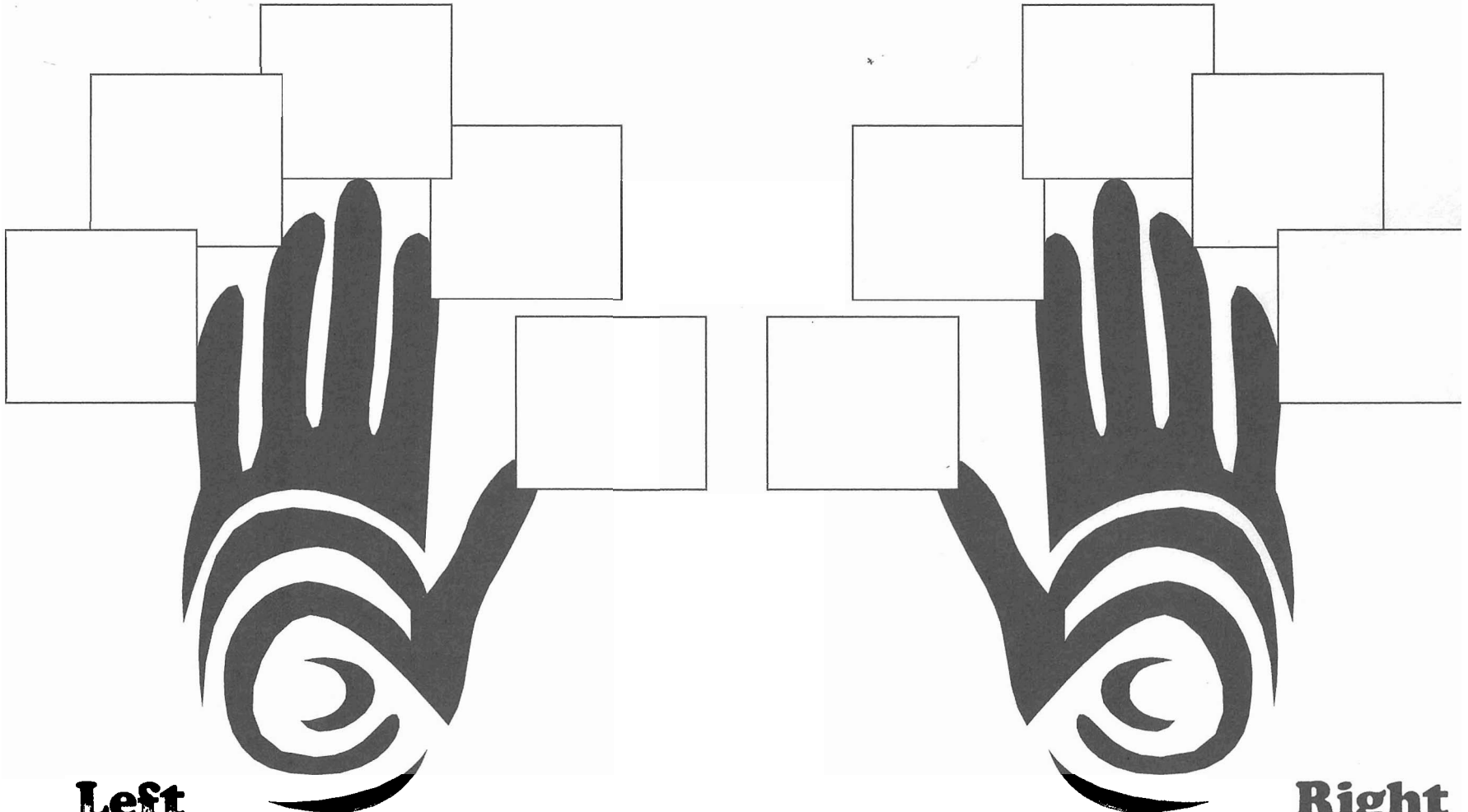
My Prints

Left

Right

Make fingerprints for each hand and then classify them according to the types presented in class.

Fingerprint Analysis

Name _____

Step 1: Classify your fingerprints and record the number of each pattern below. Your total should equal 10!

Arches = _____   Loops = _____   Whorls = _____

Step 2: Complete the chart below by recording the total number of each pattern for the class. The expected averages are 60% for loops, 35% for whorls, and 5% for arches.

Pattern	#	Total Prints	%
Arches			
Loops			
Whorls			

How do our prints compare to the expected averages?

Step 3: Complete the chart below by recording the total number of each pattern for the males and females in the class.

Pattern	# Males	# Females	Total Prints	%
Arches				
Loops				
Whorls				

Which pattern is most common pattern among the males in this class?

Which is most common pattern among the females?

How do the averages for each sex compare to the expected averages?

Fingerprint Basics

Name _____

Use the websites listed on the *Forensic Science* page of the *Kid* Zone at http://sciencespot.net/ to complete this worksheet. The links are listed in the Fingerprint Basics section.

Site #1: NIST Matching Up Fingerprints

1. Click the link for "Solving Crimes, Improving Security" and work you way through the pages to complete this section. WAIT for the blue CONTINUE or NEXT SECTION buttons before you move ahead.

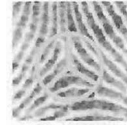A. What does the acronym FBI mean? _____

B. How many fingerprints are in the FBI master database of criminal files? _____

C. What is another term for a partial print found at a crime scene? _____

D. What do fingerprints consist of? _____ and _____

F. What are the three main types of fingerprints? _____ _____ _____

G. What type of minutiae points are shown below?

_____   _____   _____   _____

H. How many minutiae points must be in common between the latent and suspect print to be considered a match?

_____

I. How many minutiae points will match on a complete fingerprint? _____

J. What type of fingerprint equipment is replacing "inked" fingerprints? _____

K. Follow the directions to find a print that matches the latent print from the stolen car. Which suspect matched the latent print? _____

L. Which type of fingerprint is most common? _____

M. Which type is least common? _____

2. Return to the first page of this site and scroll down to find the link for "Now try our fingerprint matching game!" Click the link and keep track of the number of guesses you needed to find the correct one.

- Which fingerprint was the correct one? _____

- How many guesses did it take to find the correct one? _____

Site #2: TruTV Fingerprint Game
Choose the "Fingerprints Game" link and follow the directions to match the prints. Try the game at least 5 times and record your efforts in the chart.

To identify the prints, use the corresponding letters below.

| A | B | C | D | E |

Print	1	2	3	4	5
# of Guesses					
Correct Print					

Site #3: PBS Whodunit?

Click the link for "Whodunit?" Read the information presented and follow the directions to complete this activity.

What was the crime? _____

What time did it happen? _____ Where? _____

How many people were involved? _____

How many fingerprints did you collect from the bank? _____

How many other fingerprints did you find that could not be used? _____

Who are your main suspects? _____

Why would you fingerprint the bank employees? _____

Follow the directions to match prints from the evidence files to the ones in the fingerprint files.

Which person was responsible for the crime? _____

Done? Try the games listed below. The links are listed in the Mysteries & More section.

☐ The Mystery of the Hidden Mine – Who did it? _____
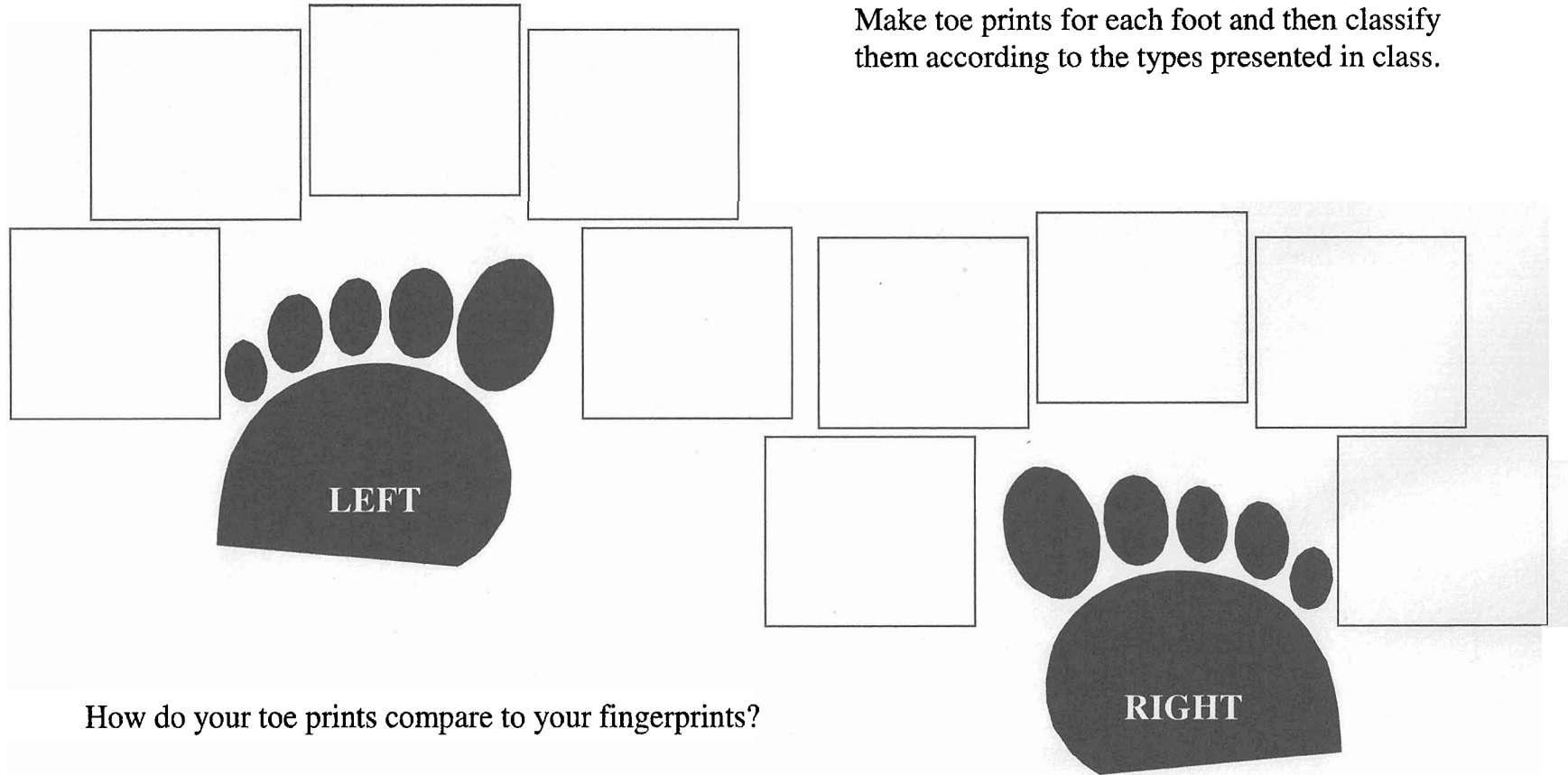
☐ Burgled Bonuses – Who did it? _____

Don't forget to turn in your worksheet!

My Toe Prints

Name _____

Make toe prints for each foot and then classify them according to the types presented in class.

LEFT

RIGHT

How do your toe prints compare to your fingerprints?