Firearms Identification

Firearms and Ballistics

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Firearms Identification

A discipline mainly concerned with determining whether a bullet or cartridge was fired by a particular weapon.
Rifling – the spiral grooves that are formed in the bore of a firearm barrel. Makes projectile spin when fired.
**Caliber** — the diameter of the bore of a rifled firearm. The caliber is usually expressed in hundredths of an inch or millimeters. Example: .22 caliber or 9mm.

Broach cutter used to create rifling impressions in a barrel.
Cartridge Parts and How it Works

Cartridge Case

Primer

Gun Powder

Lead Bullet

FIRING PIN
PRIMER FLASH
FLASH HOLE

BURNING POWDER
EXPANDING GAS

BULLET MOVING DOWN BARREL
Bullet Comparison

Class Characteristics

Different gun manufacturers use different rifling techniques. These techniques impart the class characteristics of a bullet.

- Number of lands and grooves
- Width of lands and grooves
- Depth of lands and grooves
- Pitch
- Twist
Bullet Individual Characteristics

- A cross section of a gun barrel will show small grooves or striations all along the lands and grooves (machine markings)

- These are created when the barrel is rifled. No two gun barrels have the exact same markings.

- These markings leave unique striations or impressions on a bullet. This allows a bullet to be traced back to a particular firearm.
It is possible to determine the bullet on the left and the bullet on the right are from the same gun by matching the striations. See examples A and B.
Cartridge Case Class Characteristics

- Manufacture (i.e., Winchester)
- Shape (i.e., rimless, rimmed)
- Caliber (i.e., .45 ACP, 9mm, 12 gauge)
- Composition (i.e., brass, steel, plastic)
Cartridge Case Individual Characteristics

- Firing Pin Impressions
- Breech Face Marks
- Ejector Marks
- Extractor Marks
Breech
Extracting Pin
Firing Pin
Ejector (not shown)

Heckler & Koch USP 45
When a cartridge is fired, the explosion forces the bullet down the barrel and the shell casing is forced back against the **breech**. This leaves impressions unique to the individual gun’s **breech** on the shell casing.
Examples of Breech Markings

- Heavy Left Side
- Vertical
- Sandblasted
- Mottled
- Rim Dents
- Mouse Ears
Firing Pin Marks

In order to fire the cartridge, the primer must first be ignited. To accomplish this a firing pin strikes the center ring of the cartridge. This will in turn leave a distinct impression that is unique to the firing pin of that particular gun.
Breech Marks

Firing Pin Mark
Extracting Pin and Ejector Marks

The extracting pin and ejector throw the spent shell casing from the chamber of the gun.

These leave marks on the shell casing that are unique to those parts on that particular firearm.
Shotguns have smooth barrels with no rifling. Therefore there are no land or groove marks left on the bullet. Identification can still be made by comparison of extractor/ejector markings on shotgun shell.
Define the term “Firearm Identification”.

The discipline concerned with determining if a bullet or cartridge casing was fired by a particular gun.
What is the purpose the lands and grooves that comprise the rifling in a gun barrel?

The lands and grooves make the bullet spin as it exits the gun barrel. This makes the bullet fly more accurate.
How do you determine the caliber of a gun?

You measure the distance from land to land in hundredths of an inch or mm.
What are the four parts of a cartridge?

- Firing pin
- Primer
- Flash hole
- Burning powder
- Expanding gas
- Bullet moving down barrel
Pretend you recover a bullet from a crime scene. How could you determine what kind of gun fired that bullet?

- The number of land and groove impressions
- The distance between the land and groove impressions
- The pitch and twist of the land and groove impressions.
What type of individual characteristics can be used to match a shell casing back to an individual gun that fired it?

- Firing pin impressions
- Breech impressions
- Extracting pin marks
- Ejector marks
What is the difference between class characteristics and individual characteristics?

Class characteristics are general and can trace something back to a class or group (a type of shoe or tire). Individual characteristics can trace something back to a particular source (a particular person's shoe or a particular car).
What type of gun would you not be able to trace back to the bullet that fired it?

Shotguns do not have rifling and therefore do not leave impressions on the bullet.