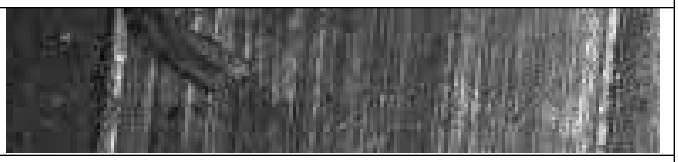
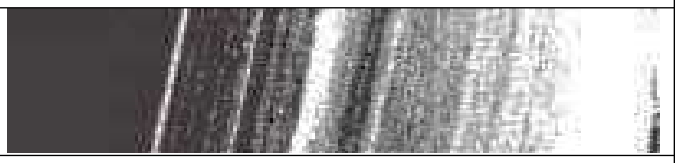
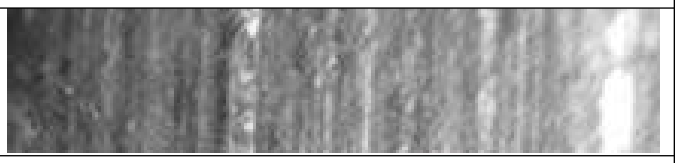
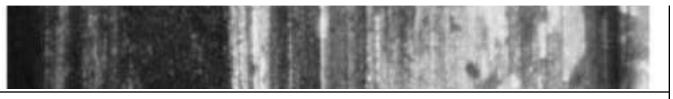
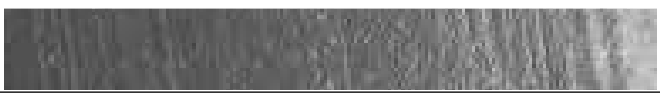
Ballistics

Complete the worksheet BEFORE we do we do notes in class

Match the terms to the definitions using the striations as a guide

The study of projectiles and firearms **Ballistics**	
The path of flight of a projectile **Trajectory**	
Measure of the inside of the firearm barrel **Caliber**	
A weapon capable of firing projectiles using explosives **Firearm**	
Tiny particles expelled from a firearm when fired **Gunshot Residue**	
Case that holds a bullet, primer, and gun powder **Cartridge**	
the barrel of a gun **Rifling**	
by Chinese alchemists **Gun Powder**	

The projectile launched from a fire arm	
Bullet	

Ballistics

Learning Objectives:

- ❑ I can explain the discovery of gun powder
- ❑ I can explain how bullets are test fired and matched
- ❑ I can determine the position of a shooter based on bullet trajectory

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What is Forensic Ballistics

The scientific _____ _____ _____ _____

all _____ _____ _____ with the purpose of interpreting and establishing the facts in a shooting related crime

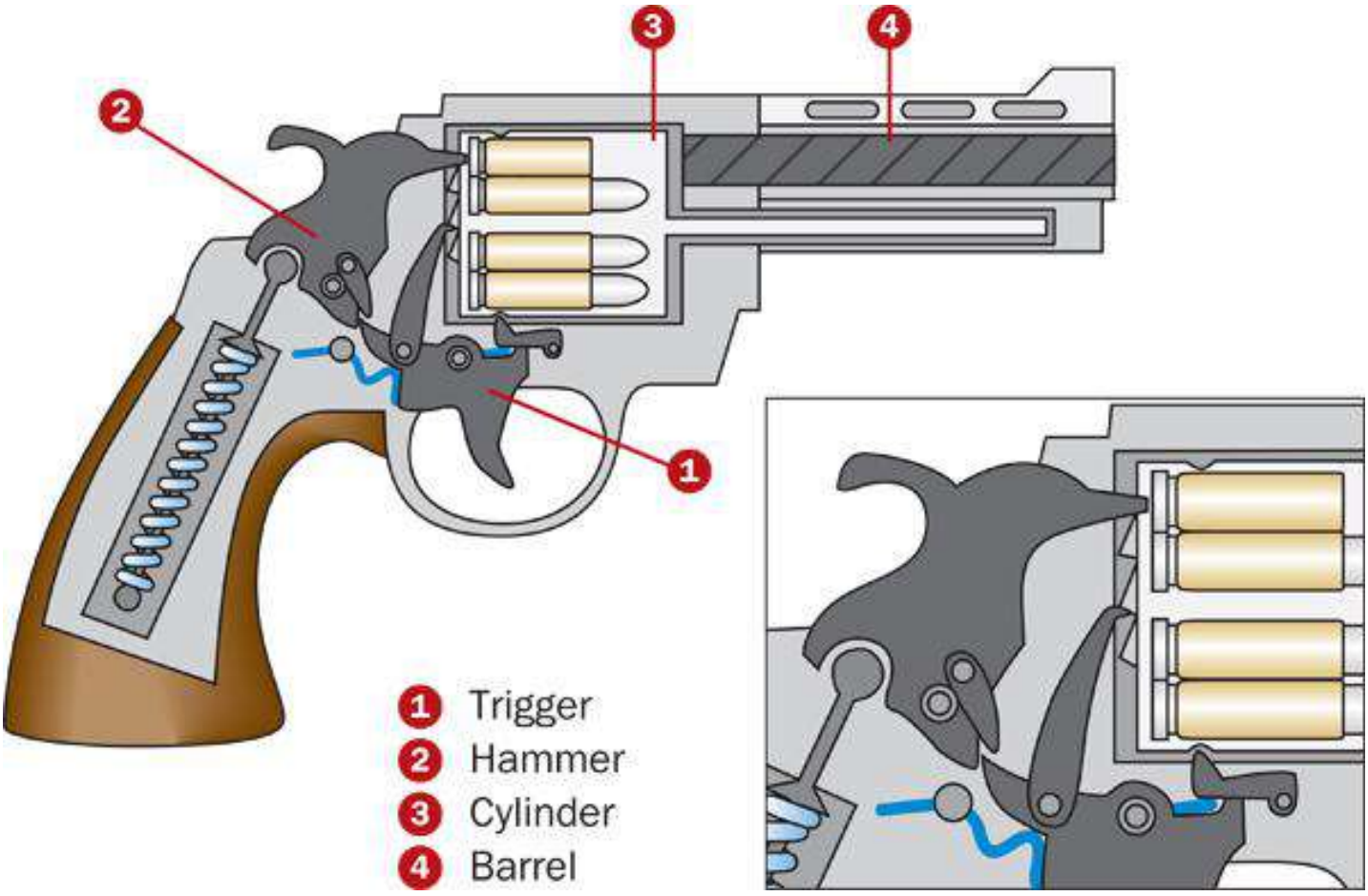
When and where was gunpowder first used in combat?

1356 Nanjing, China

Who first discovered gunpowder? What were they looking for?
Chinese Monks, looking for the elixir of life.

What was gunpowder primarily used for prior to its use in weaponry?
For fireworks

What was the problem with early firearms?
Having their bullets leave the guns and go in the right direction



How Firearms Work

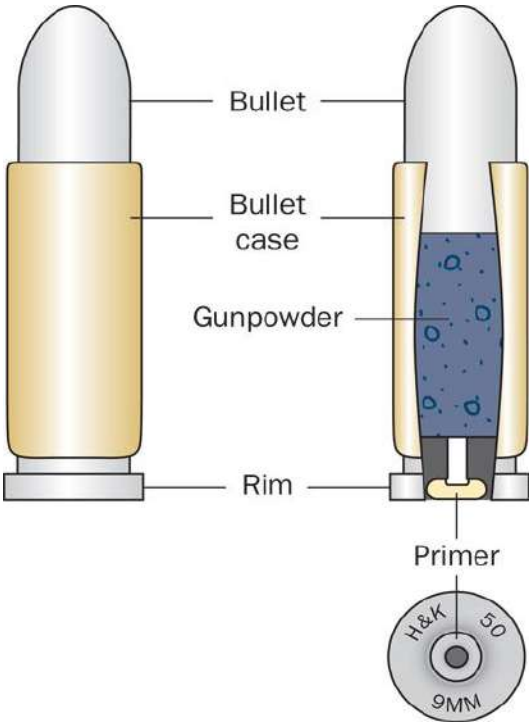
The _____ _____ hits the base of the cartridge, _____ the _____ powder.

The primer powder sparks through the flash hole to the main _____ supply

The pressure of the _____ _____ _____ _____ from the casing into the barrel

The bullet follows the lands and grooves

out of the



Anatomy of a Cartridge

The _____.

The metal projectile firing from the gun.

The casing or _____.

The outer portion or the cartridge.

The _____.

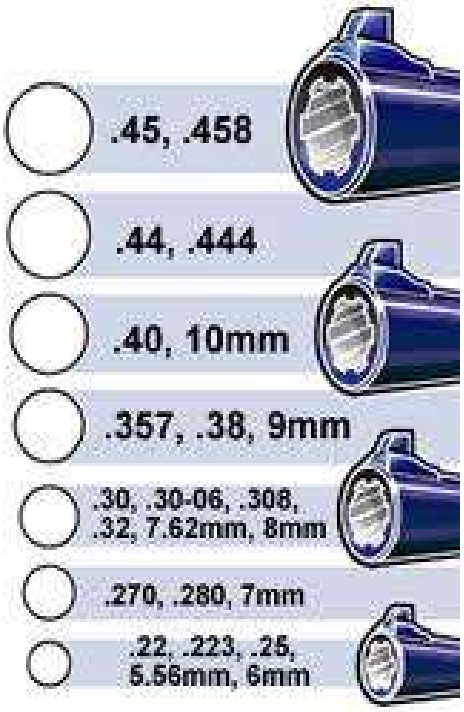
Combustion reaction produces gas, rapidly expanding to fire the bullet out of the gun.

The _____.

Grabbed by the ejector removing a spent cartridge from the gun

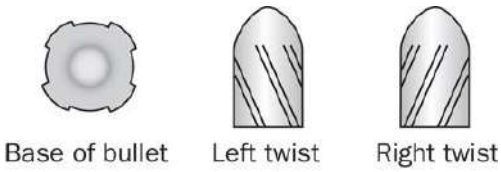
The _____.

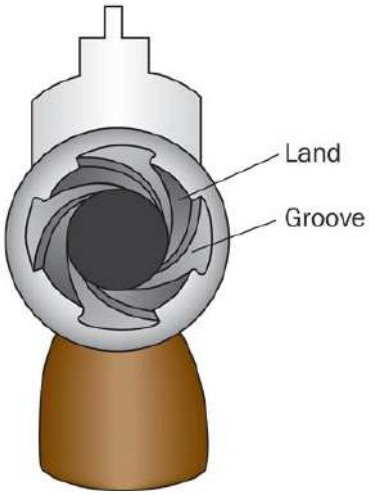
Hit by the pin to begin



Caliber

Caliber is a measure of the





Scenario

A suspect was named in a homicide case. Two guns were collected from the suspects home to compare bullets fired from the suspects guns to those found in the victim. Identify particular striations used in determining whether the suspects gun was used in the shooting. Which, if either is a match?

Rifling and Striations

Grooves and ridges in the barrel causes the bullet to spin, making aim more _____.

This creates _____ that can match a bullet to a particular gun

Gunshot Residue

Particles of unburned powder and traces of smoke are left on the _____, _____, _____, _____, or _____ of the shooter and/or victim

Chemical testing can detect residue even if removal is attempted

Distance from victim to shooter can be determined by examining the residue pattern on the victim

Trajectory

Two reference points are needed to define the trajectory. Reference points can be

- Bullet holes in objects or victims
- Entry and exit points on a victim
- Gunshot residue or spent casings

The path of a bullet can be traced with lasers or calculated mathematically

Pythagorean Theorem: _____

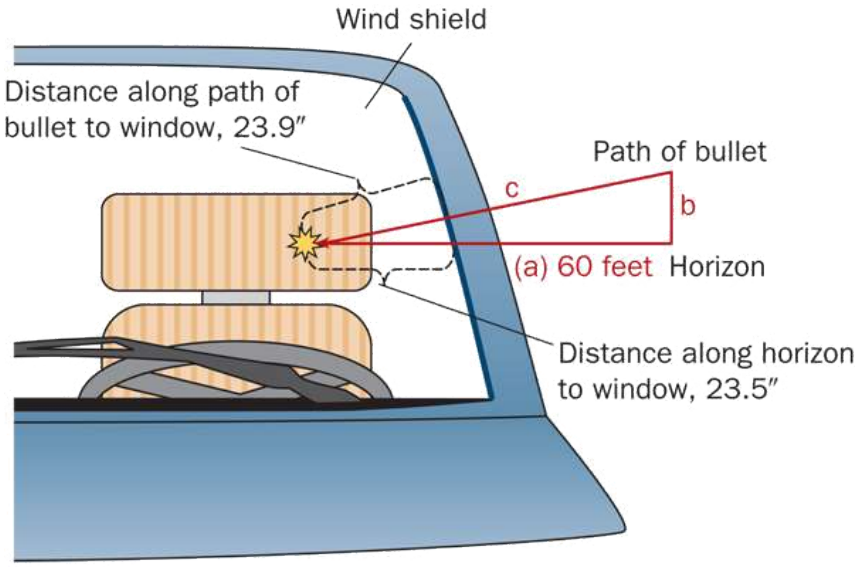
$Sin =$ ——— $Cos =$ ——— $Tan =$ ———

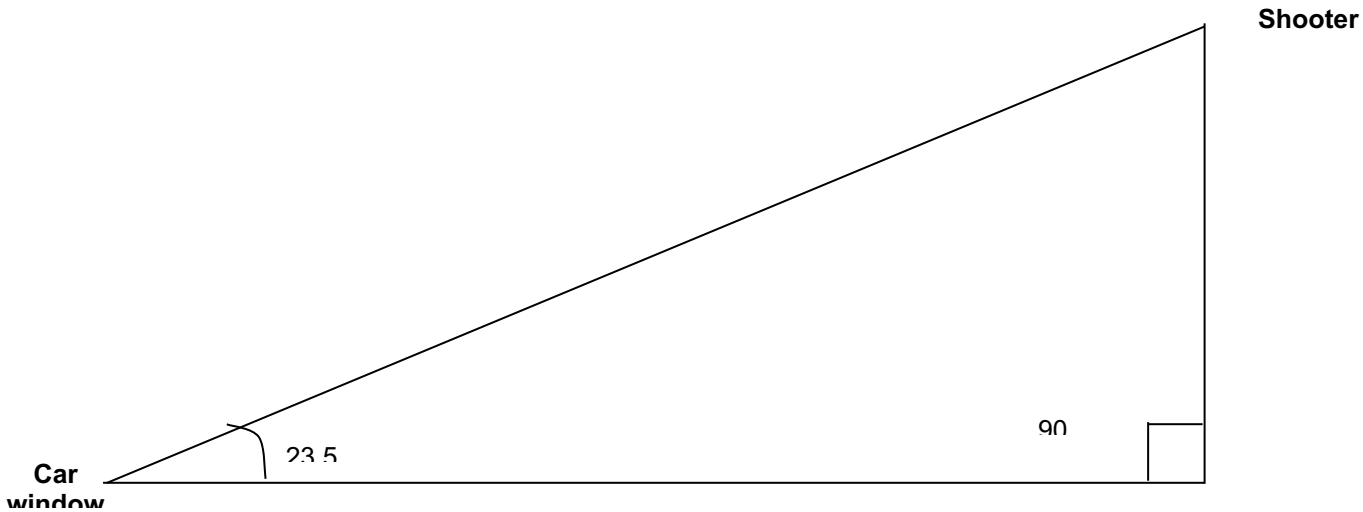
Scenario

A rifle was shot from a nearby building through the windshield of a car and hit the drivers side seat.

If the bullet struck at an angle of 23.9° from a building 60 feet away, what floor of the building was the bullet shot from? Assume each floor is 10 ft tall.

If the bullet travels at 2,500 ft/s, how long does it take for the bullet to hit the victim? V=d/t



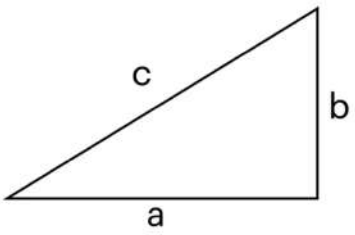


60 feet

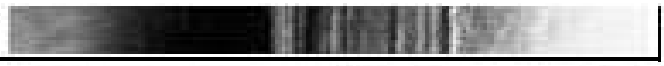
$$\sin\theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$$

$$\cos\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$

$$\tan\theta = \frac{\text{Opposite}}{\text{Adjacent}}$$



$$c^2 = a^2 + b^2$$

Rifling	
Gunshot Residue	
Ballistics	
Cartridge	
Firearm	
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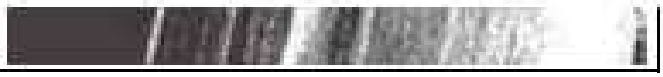
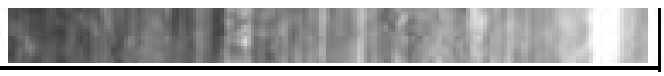
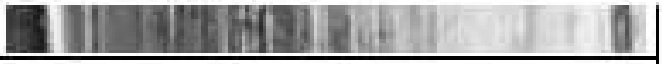
Caliber	
Bullet	
Trajectory	

Rifling	
Gunshot Residue	

Ballistics	
Cartridge	
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Trajectory