BALLISTICS

• **Internal Ballistics** - projectile inside the weapon.

• **External Ballistics** - projectile in flight.

• **Terminal Ballistics** - projectile striking the target.
INTERNAL BALLISTICS

- As the powder begins to ignite and chamber pressure builds, the bullet is thrust forward to engage the rifling.
The pressure builds as more powder ignites, adding velocity to the projectile.
• As the round travels down the barrel, it is rotated by the rifling cut into the barrel.

• The rotation will stabilize the round once it exits the barrel.
EXTERNAL BALLISTICS

- As soon as projectile exits the bore, velocity drops and air drag slows round down.
TRAJECTORY

Max ordinate 4.6 inches

LINE OF SIGHT

RANGE

36  100  180  200  300
MAXIMUM ORDINATE

Line of Sight

Trajectory

Yards

300 Yard Zero -2.5 -1.8 -1 -0.4 0.3 0.9 1.4 1.9 2.4 2.8 3.2 3.5 3.8 4.1 4.3 4.4 4.5 4.6 4.6 4.5 4.4 4.2 4 3.7 3.4 3 2.5 2 1.4 0.7 0
• Bullet crosses line of sight on upward path at 36 yards; crosses again on downward path at 300 yards.
Engagement at Less Than 36 Yards

- Shots will be below sight picture
- Must aim higher to be accurate
BALLISTICS AT CLOSE RANGES

Line of Sight

Trajectory

Yards

300 Yard Zero

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50

-3 -2 -1 0 1 2 3 4 5

-2.6 -2.4 -2.3 -2.1 -2 -1.9 -1.7 -1.6 -1.4 -1.3 -1.1 -1 -0.9 -0.7 -0.6 -0.5 -0.3 -0.2 0 0.1 0.2 0.3 0.4 0.5 0.7 0.8
Engagement at 50 and 100 Yards

- Shots will be above sight picture
- Must aim lower to be accurate
BALLISTICS AT CLOSE RANGES

Line of Sight

Trajectory

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Yards
TEMPORARY CAVITY

- Friction causes round to tumble, creating temporary cavity.
- Shock is transmitted through body fluids.
PERMANENT CAVITY

- Tissue crushed and torn by the projectile will remain open as the permanent cavity.
Hydraulic Decompression (Bleed Out)

- Heart or vascular structure.
- Target can still effectively fight for 10-15 seconds.
- Not effective for close range fight, though will usually lead to death.
BRAIN

Cerebrum

Cerebellum

Medulla Oblongata

Central Nervous System
IMMEDIATE INCAPACITATION
AIMING POINTS FOR THE HEAD

Frontal Shot:
“T-Box”
VITAL AREAS OF THE BODY

- Base of Throat
- Heart and Major Vascular Structures
- Liver
- Kidneys