



# MASTER MARKSMANSHIP TRAINING COURSE



# Ballistics



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## Ballistics

**Everything that happens to the projectile from the time the primer is struck by the firing pin until the projectile comes to a complete stop.**

**There are three ballistic phases:**

- 1. Internal**
- 2. External**
- 3. Terminal**



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## EXTERNAL BALLISTICS FACTS

- A. Gravity and air resistance have a constant and continuous effect on a bullet passing through the air
- B. This constant effect causes the flight (trajectory) of the bullet to be a definitive and uniform arc.
- C. A common cylindrical bullet has no loft capabilities. It never rises under its own power.
- D. The sole purpose of the spin that is imparted upon a bullet is to keep the projectile from tumbling end over end.
- E. A bullet fired from a true horizontal barrel begins to slow down and fall towards the earth immediately upon leaving the muzzle of the weapon.



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## Ballistics

**A bullet flying through the air(WITHOUT WIND) is acted upon primarily by two forces, which change the direction and velocity of its motion.**

These two forces are:

1. Gravity

-Causes the bullet to fall towards the earth

2. Air Resistance

-Causes the bullet to slow down

-Causes the bullet to fly erratically and tumble



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## Ballistics

We as shooters counter these forces on the bullet by:

- A. *Increasing the angle of departure (elevating the muzzle)*** to counter the effects of gravity
- B. *Imparting spin*** and ***high velocities*** on the bullet counter air resistance and allow the bullet to fly in an nose forward manner at far distances.



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**These two basic concepts will help you to visualize how a bullet is sent through the air when leaving a rifle barrel.**

**A. The flight of a football.**



**B. A child's top.**





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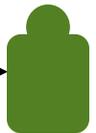
## Parts of Trajectory

### Line of Sight:

This is what the shooter sees behind the sights and can be illustrated by drawing a straight imaginary line from your eye through the rear and front sights out to the target

This is how you aim.

Line of Sight





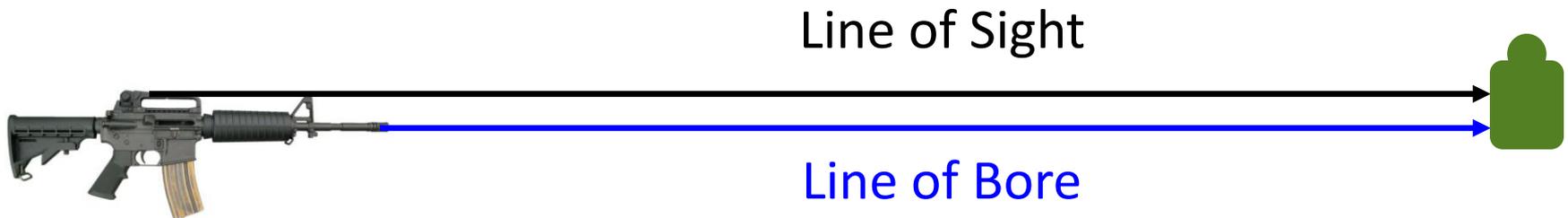
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## Trajectory

### Line of Bore:

This is a straight imaginary line that is drawn from the muzzle of the rifle out to the target



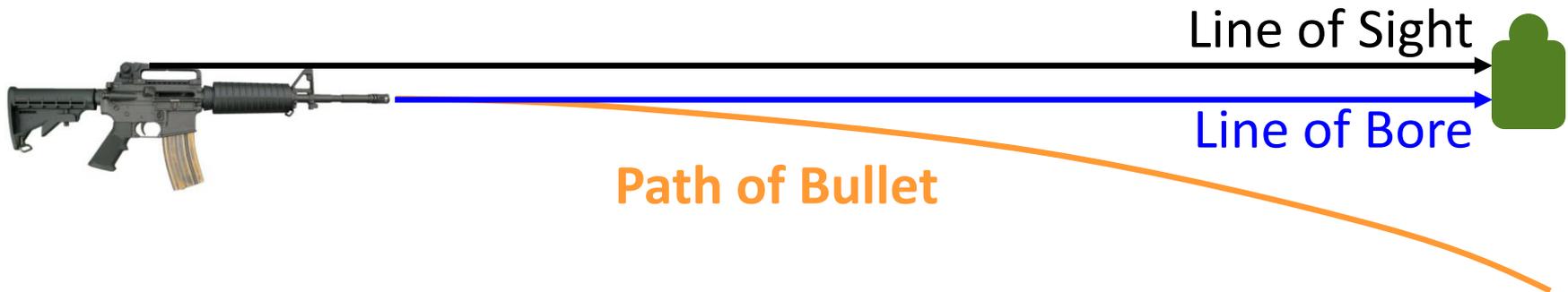


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## Trajectory

**Trajectory** is the path that the bullet will take when it is fired from the rifle



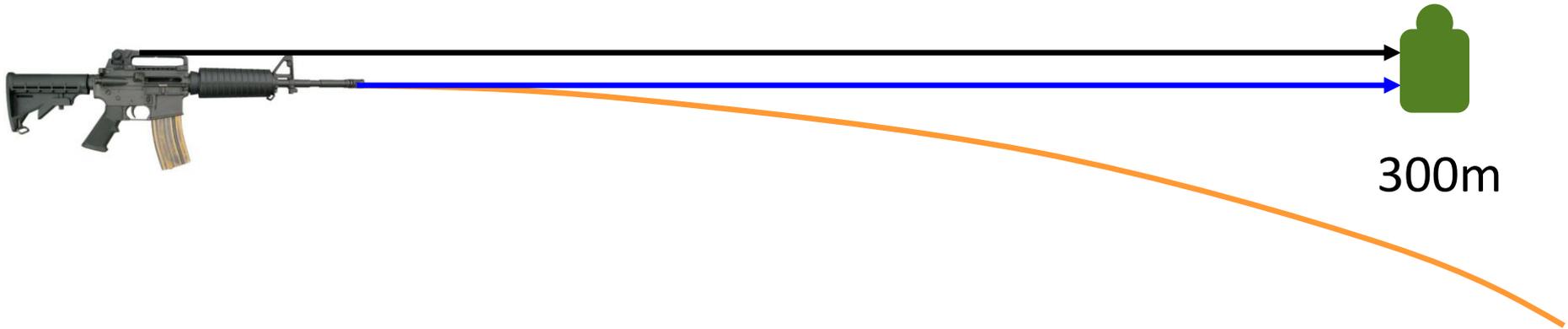


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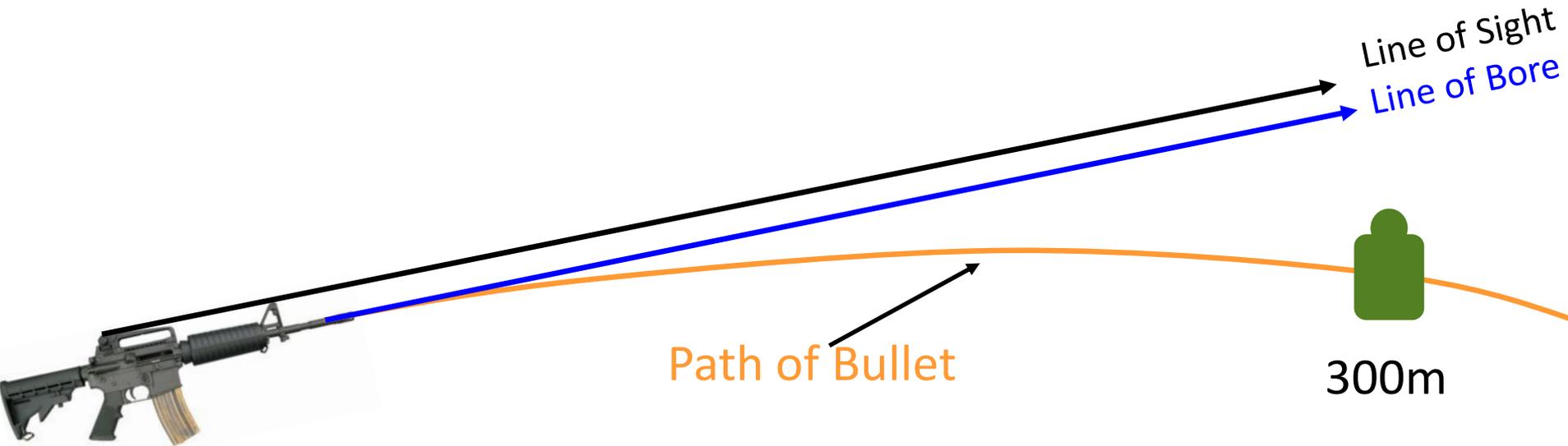
## Trajectory

What has to change so that the bullet can hit the target?





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- Increase the angle of departure
- Raising the muzzle will cause us to lose sight of the target.
- This is why we adjust our sights. So that we can aim at the target and have enough elevation to hit it.



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## Trajectory

