

Long Distance Rifle Outline

**4 - 5 Hour Class (1 Hour Technique and Classroom 3-4 Hours Shooting)**

***Individual $300.00 / Group Rate of 3 or more $275***

* **Instructor Introduction**
* **Signing of Firearm/Range Safety Sheets & Waiver**

**Firearm Safety Rules**

1. Keep your finger straight and off the trigger until you are ready to fire.
2. Never point a weapon at anything you do not intend to shoot.
3. All guns will be treated as if they were loaded at all times.
4. Be sure of your target and what is beyond it.

**Range Safety Rules**

1. Do not load, unload or handle any weapon unless you are on the firing line, no one else is down range of you, and you have permission of the instructor.
2. Muzzle will always be pointed down range on the firing line.
3. If you have a malfunction or problem with your weapon that you cannot fix, keep your weapon safely pointed down range, and raise your off hand for an instructor to come to you.
4. A safe area will be provided to work/clean weapons. No ammunition will be in the safety area for any reason.
5. The instructor has the final say on all issues regarding range safety.
6. Eye & ear protection will be worn at all times on the range
* **Eye Dominance**
* **Weapon Dynamics**
* **Weapon Handling**
* **Positioning & Eye Relief**
* **Trigger Control**
* **Atmospheric Relations**
* **Scope Dynamics & Adjustment**
* **Range Estimation**
* **Dry Fire**

Drills/Importance/Safety/Muscle Memory

* **Live Fire**

Sight in @100 Yard Line to initial ZERO

Work back to 300 & 400 then get intermediate ranges

* **Weapon Cleaning & Maintaince**



Long Range Rifle Dynamics Handout

**Effects of Light:**

Light does not affect the trajectory of the bullet; however, it does affect the way the Sniper sees the target through the scope. This can be helped by practice and a good data book.

**Effects of Temperature:**

Temperature affects the shooter, ammunition, and air density. When ammunition sits in direct sunlight, the burn rate of powder is increased, resulting in greater muzzle velocity and a higher point of impact. A general rule is that when a rifle is zeroed, a 20 degree increase in temperature will raise the point of impact by 1 MOA. A 20 degree decrease in temperature will drop the bullet 1 MOA. The key is consistency in shooting environments or knowing how the temperature change affects your shots when the consistency is off.

**Effects of Humidity:**

Humidity varies along with the altitude and temperature. A shooter can encounter problems if drastic humidity changes occur in his area of operation. If humidity goes up, then the impact of the bullet goes down due to the drag effect and "weight" that the extra water adds to a bullet in flight. We suggest a 20% rule of thumb here. Meaning that if your humidity raises 20% from the day you zeroed your rifle, then the bullet will strike 1MOA low. (*Some recommend using 40% changes instead, but your experience and data will determine the exact number for you and your rifle)*

**Effects of Minute of Angle (MOA):**

At 100 Yards every ¼ click of the rifle scopes elevation will affect the bullet ¼ inch.

At 200 Yards every ¼ click of the rifle scopes elevation will affect the bullet ½ inch.

At 300 Yards every ¼ click of the rifle scopes elevation will affect the bullet ¾ inch.

At 400 Yards every ¼ click of the rifle scopes elevation affect the bullet 1 inch.

At 500 Yards every ¼ click of the rifle scopes elevation will affect the bullet 1 ¼ inches.

At 600 Yards every ¼ click of the rifle scopes elevation will affect the bullet 1 ½ inches.

**Effects of Wind: (Most Important)**

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**0-3 mph:** Wind hardly felt, but smoke drifts **3-5 mph:** Wind felt lightly on the face **5-8 mph:** Leaves are kept in constant movement **8-12 mph:** Raises dust and loose paper **12-15 mph:** Causes small trees to sway

The “Black Hills” or “Range Minus One” formulaThis method has three steps. It bases all calculations on the effect that a 10 mph wind will have on a .308 bullet at any given range. Once you know the range, a very simple calculation provides you the effect a 10 mph wind would have at that range. You then make two adjustments to that base calculation.

1) Adjust for the actual wind speed, because all winds are not 10mph winds.

2) Adjust for the wind value based on its angle in relation to the direction of the shot you are about to take.

**The base formula for determining the wind effect on a 308 bullet is:** **Range (expressed in hundreds of yards), minus 1 equals the MOA of correction necessary for a 10 mph wind at that range.** Example: for a 500 yard shot in a 10 mph wind you need 4 MOA of wind correction. (5-1=4). It is that easy. For a 300 yard shot in the same conditions you need 2 MOA (3-1=2).

You now need to adjust for actual wind speed. Wind will move the bullet way from its flight path an amount directly proportional to the speed of the wind. A 5 mph wind has one half the effect of a 10 mph wind. A 15 mph wind will have 50% added effect. A 20 mph wind will have double the effect. Simply adjust your base calculation accordingly. Note that this formula works from 200-1000 yards. (At 100 yards a 10 mph full value wind will blow a typical .308 sniping projectile about .7 inch. Use that information rather than the formula for shots of 100 yards or less) For ranges that are in between even 100 yard range increments, round to the nearest 100 yards.

The last factor is wind angle. A full value wind is a wind that is blowing at 90 degrees to the path of the bullet. It will have the most effect. A wind that is blowing perfectly along the path of the bullet, either with the bullet or against the bullet will not blow the bullet sideways. It is called a no value wind. A wind that is blowing at a 30 degree angle off the path of the bullet is a half value wind. Many sniper schools do not break wind calling down past those three wind calls. They lump everything that is not full value or no value into a half value category. A wind table is attached which shows a more accurate representation of wind values. Here are some examples of how to use the formula.

Problem: a 500 yard shot with a 10 mph full value wind. Solution: 4 MOA  (5-1= 4 MOA the wind is 10 mph and full value so no further math is needed).

Problem: A 500 yard shot with a 5 mph full value wind. Solution: 2 MOA. (5-1=4, but because the wind is 5 mph, not 10 mph you must divide your base answer by 2 to get the answer of 2 MOA)

Problem; A 500 yard shot with a 5 mph, half value wind.  Solution: 1 MOA (5-1=4, then 4/2=2, then you must reduce the answer further because it is a half value wind 2/2=1 MOA).

Problem; A 500 yard shot with a 5 mph, quarter value wind. Solution ½ MOA (5-1=4, then 4/2=2 then you must reduce the answer further because it is a quarter value wind 2.5/2=1 1/4 MOA) – This is very common.