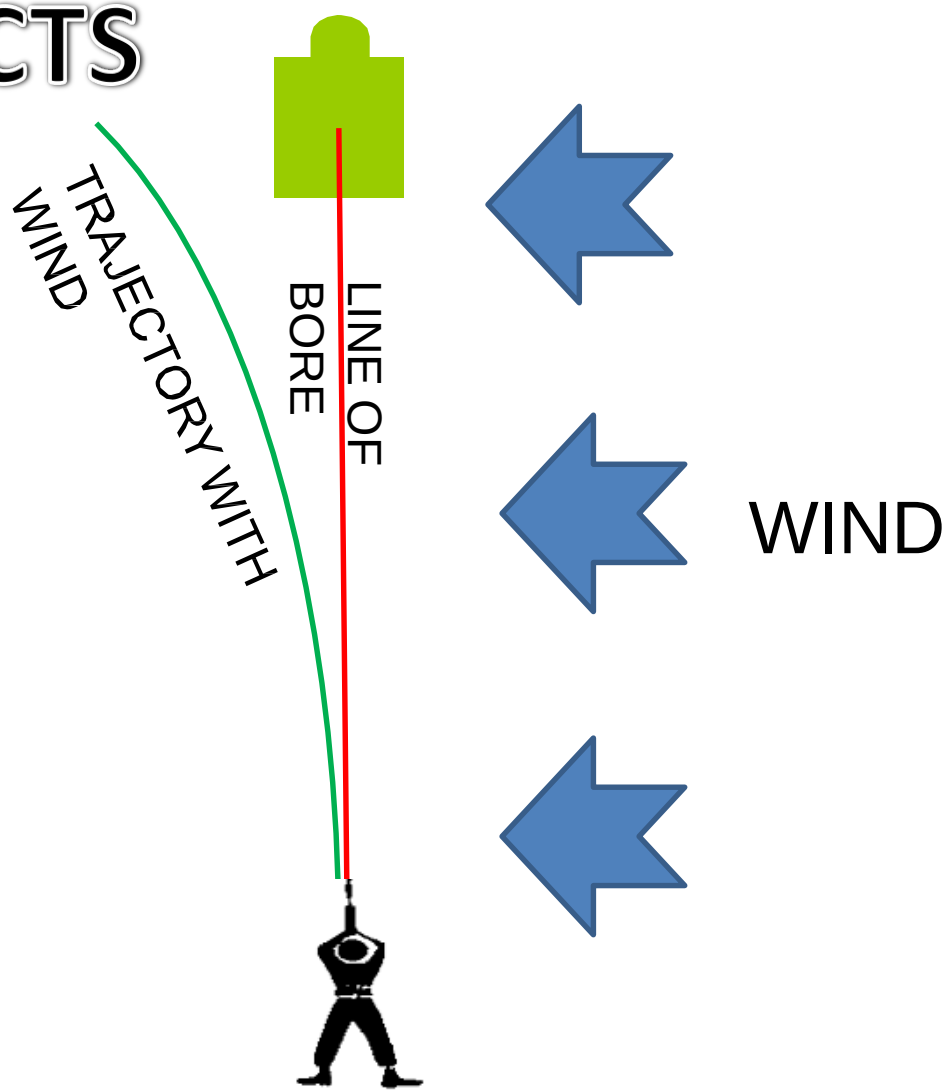
Wind and Weather

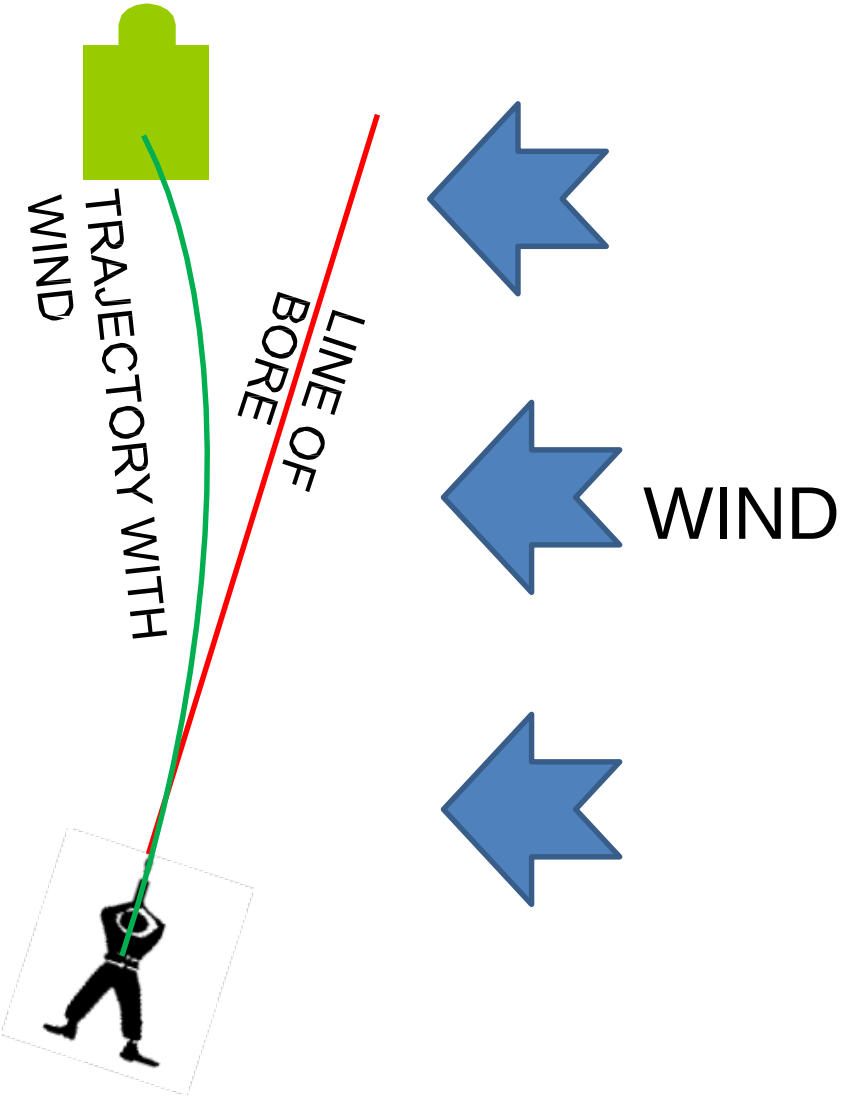
Wind

- Wind has the greatest <u>VARIABLE</u> effect on ballistic trajectories
- Elements of wind effects
  - The time the projectile is exposed to the wind (DISTANCE to target)
  - Direction the wind is blowing
  - Velocity of the wind

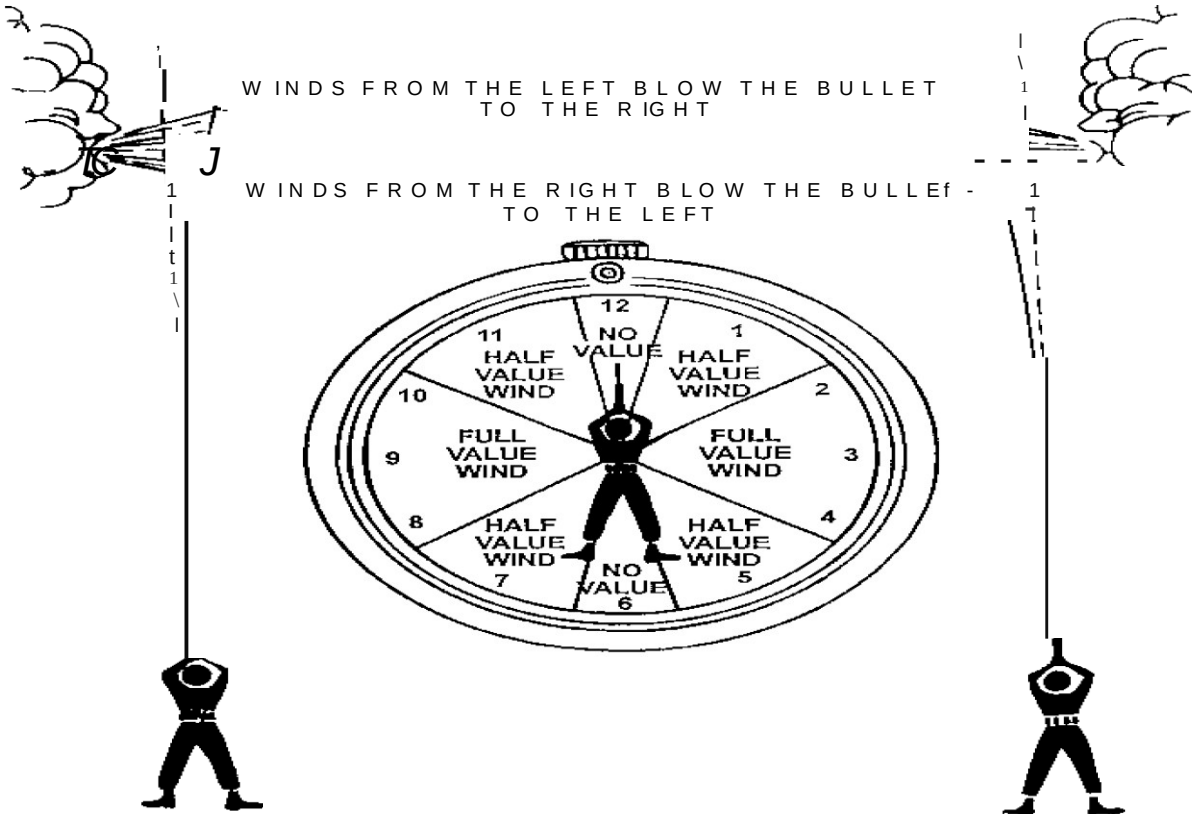
WIND EFFECTS



WIND EFFECTS

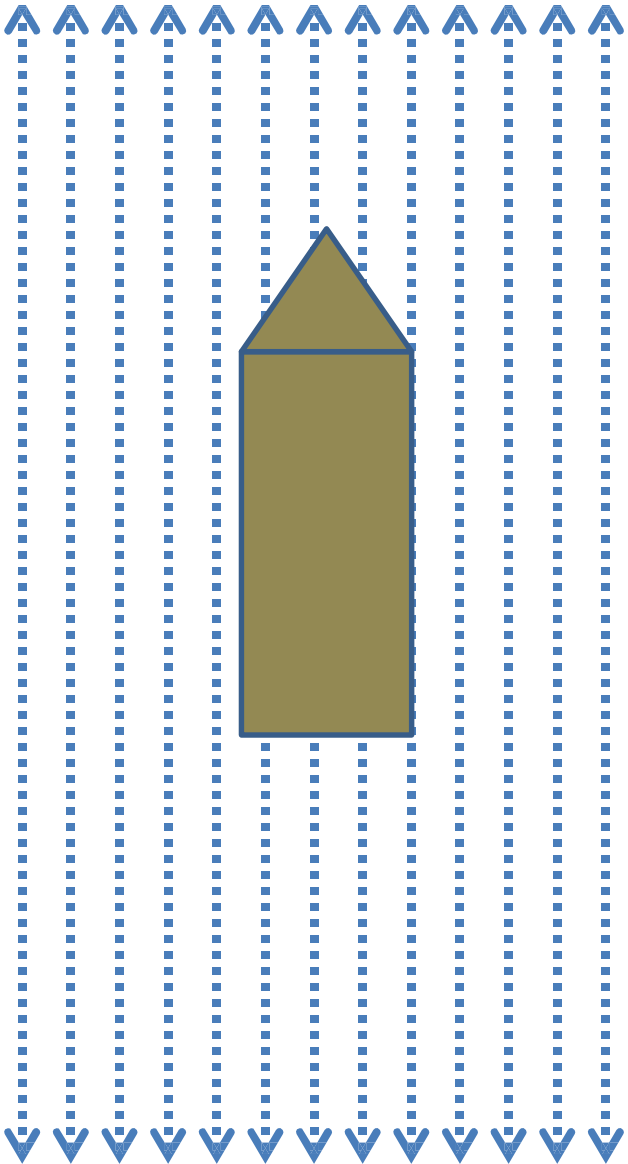


Wind Direction

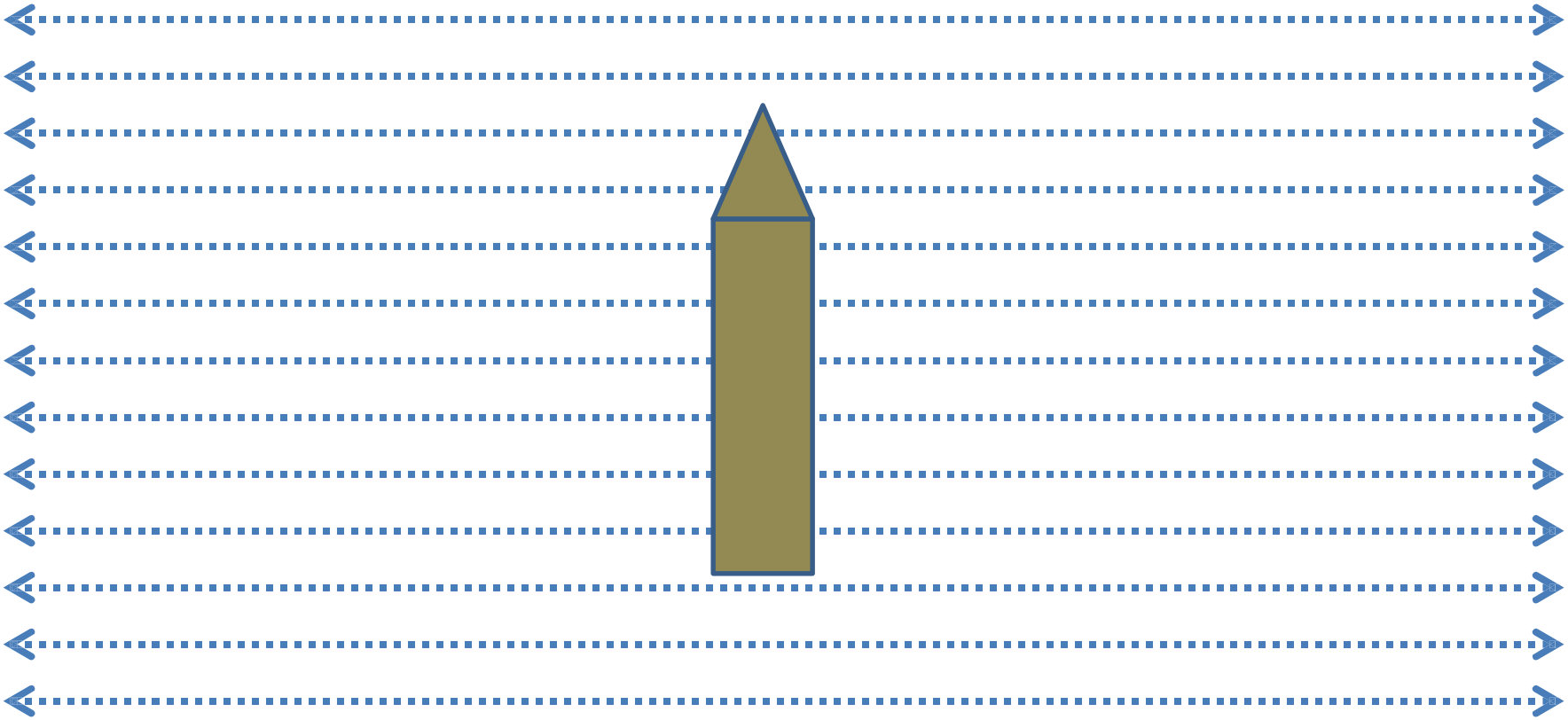


CLOCK SYSTEM

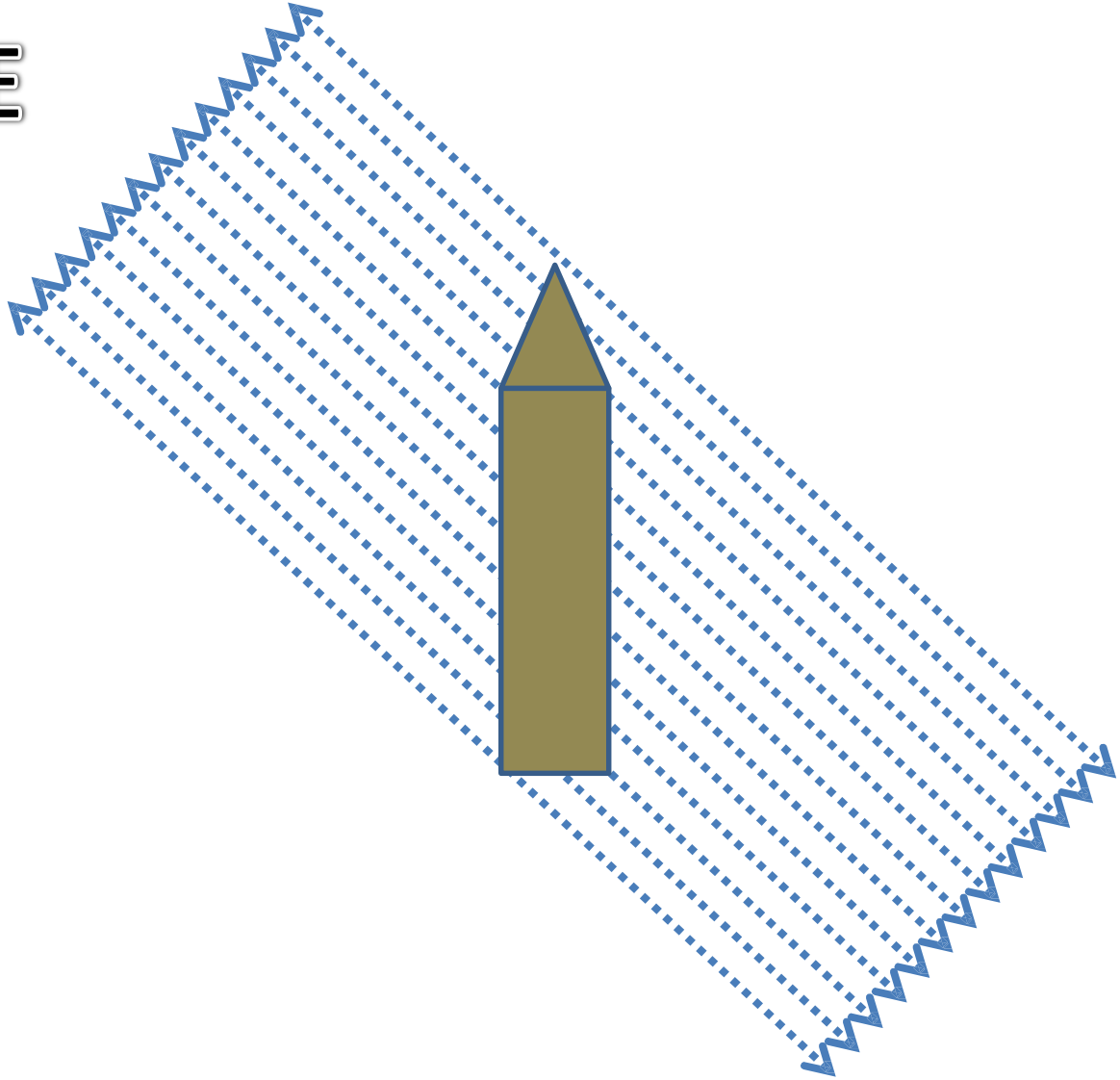
NO VALUE WIND



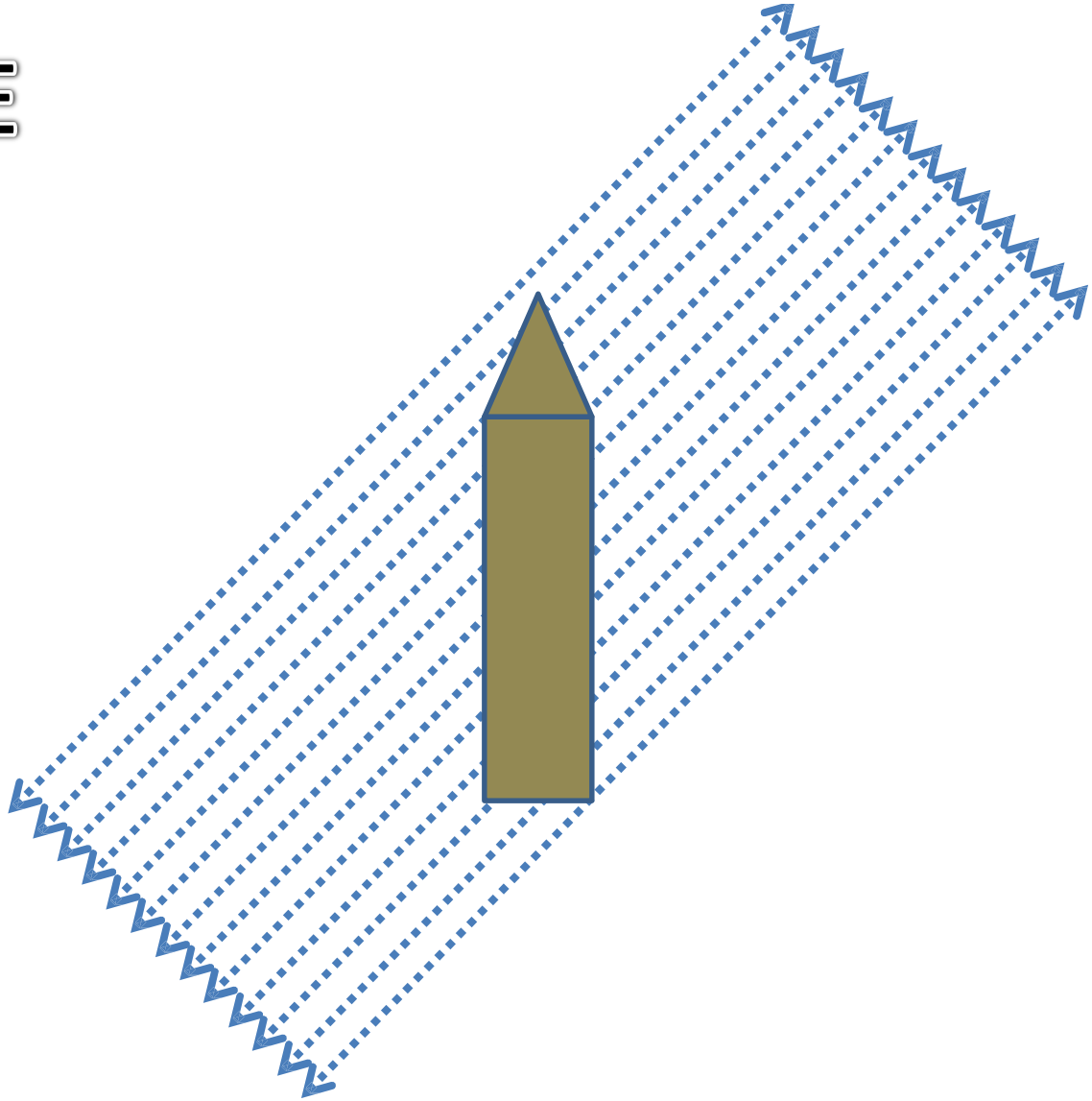
FULL VALUE WIND



HALF VALUE WIND



HALF VALUE WIND



WIND ESTIMATION

- Utilize wind indicators between shooter and target
- Things to determine
  - Velocity
  - Direction

WIND ESTIMATION

- Wind Indicators
  - Felt on skin
  - Foliage movement
  - Debris and dust movement
  - Mirage

Wind Speed Estimation

0-3 mph - Hardly felt, but smoke drifts

3-5 mph - Felt lightly on the face

5-8 mph - Keeps leaves on trees in constant movement

8-12 mph - Raises dust and loose paper

12-15 mph - Causes small trees to sway

LEARNING TO READ WIND

- Use of Kestrel or other anemometer
- Study previous shots
- Watch trajectory through spotting scope

Wind Formula for 5.56mm

$$\frac{\text{Range(meters) X Velocity(MPH)}}{7} = \text{MOA of Drift}$$

Example

$$\frac{\text{4(00) meters X 7 mph}}{7} = \text{4 MOA or 16”}$$

$$\frac{\text{Range(meters) X Velocity(MPH)}}{7} = \text{MOA of Drift}$$

1) 300m @ 10mph	4.28 (round to 4 MOA)
2) 500m @ 7mph	5 MOA
3) 600m @ 15mph	12.85 (round to 13 MOA)
4) 400m @ 20mph	11.42(round to 11 MOA)
5) 100m @ 14mph	2 MOA

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Wind Formula Work Sheet

For <u>half value</u> wind

$$\frac{\text{Range(meters) X Velocity(MPH)}}{7} \quad / \ 2 \quad = \quad \text{Half value MOA of Drift}$$

1) 300m @ 10mph	4.28 ÷ 2 = 2.14 Round to 2 MOA
2) 500m @ 7mph	5 MOA ÷ 2 = 2.5 Round to 3 MOA
3) 600m @ 15mph	12.85 ÷ 2 = 6.425 Round to 6 MOA
4) 400m @ 20mph	11.42 ÷ 2 = 5.71 Round to 6 MOA
5) 100m @ 14mph	2 MOA ÷ 2 = 1 MOA

Develop a Hold-Off

200 m target
20 mph wind from the right
Full value

$$\frac{20 \times (2)00}{7} = 5.7 \text{ (round to 6) MOA}$$

6 MOA x (2)00 (the distance to the target)

12 inches of hold off.

E type target width is 20 in. ½ target is 10 in.

12 inch hold off is just over half a target into the wind

Using Wind Estimation Effectively

1. Estimate minimum and maximum wind velocities (form a bracket, “I believe the wind is no slower than X and no faster than Y”)

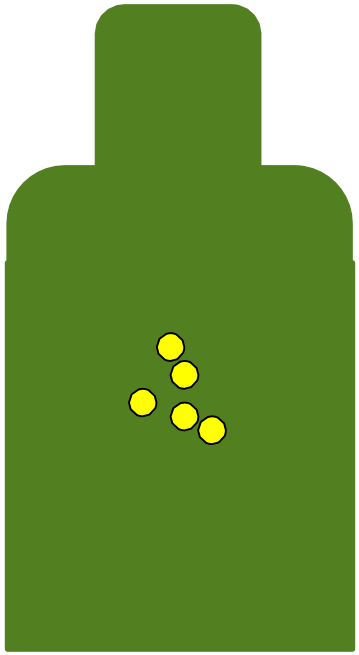
2. Estimate value of wind (use clock method)

3. Calculate wind holds for your bracket (use the wind formula and convert MOA to Hold off)
4. As conditions change adjust your hold off based on your bracket.

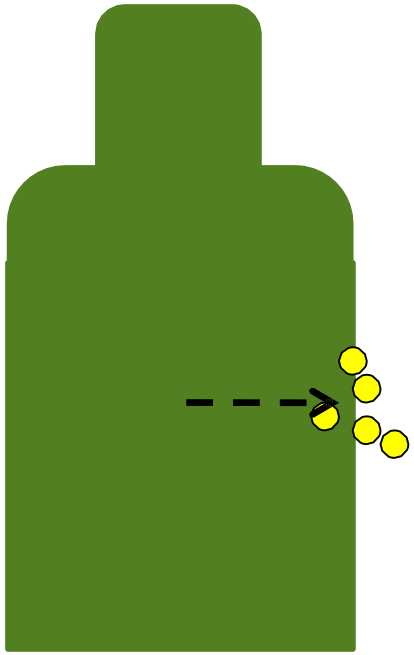
ZEROING IN WIND

Zeroing at 300 meters in windy conditions.

Shooting the next day with the same zero but with NO wind blowing.



This applies to zeroing at distance. Not 25 meters.



Other Weather Factors

Although wind has the greatest effect on your bullet trajectory there are other factors to take in to account.

- Temperature – temperature will affect your muzzle velocity (hotter temperature equals faster powder burn rate which equals faster muzzle velocity. This will affect your zero)
- Temperature – temperature affects air density, dense air is thicker and will slow your bullet down sooner. This with other factors must be taken into account but you should remember that a drastic change in temperature will affect your zero as well.
- Elevation – elevation affects air density as well. If your weapon was zeroed at a low elevation and you are operating in a high elevation there will be a change to your zero.

EFFECTS OF WIND

Same techniques of “hold-off” as with iron sights.
Use of scope allows observation of bullet impacts not on target. Note the lateral distance from the target, and place that hold off to re-adjust and fire.

MOVING TARGETS

Utilize the same lead concept as in iron sight shooting.

Lead your target considering the following:

- Speed of target
- Angle of target movement
- Range to target
- Wind effects

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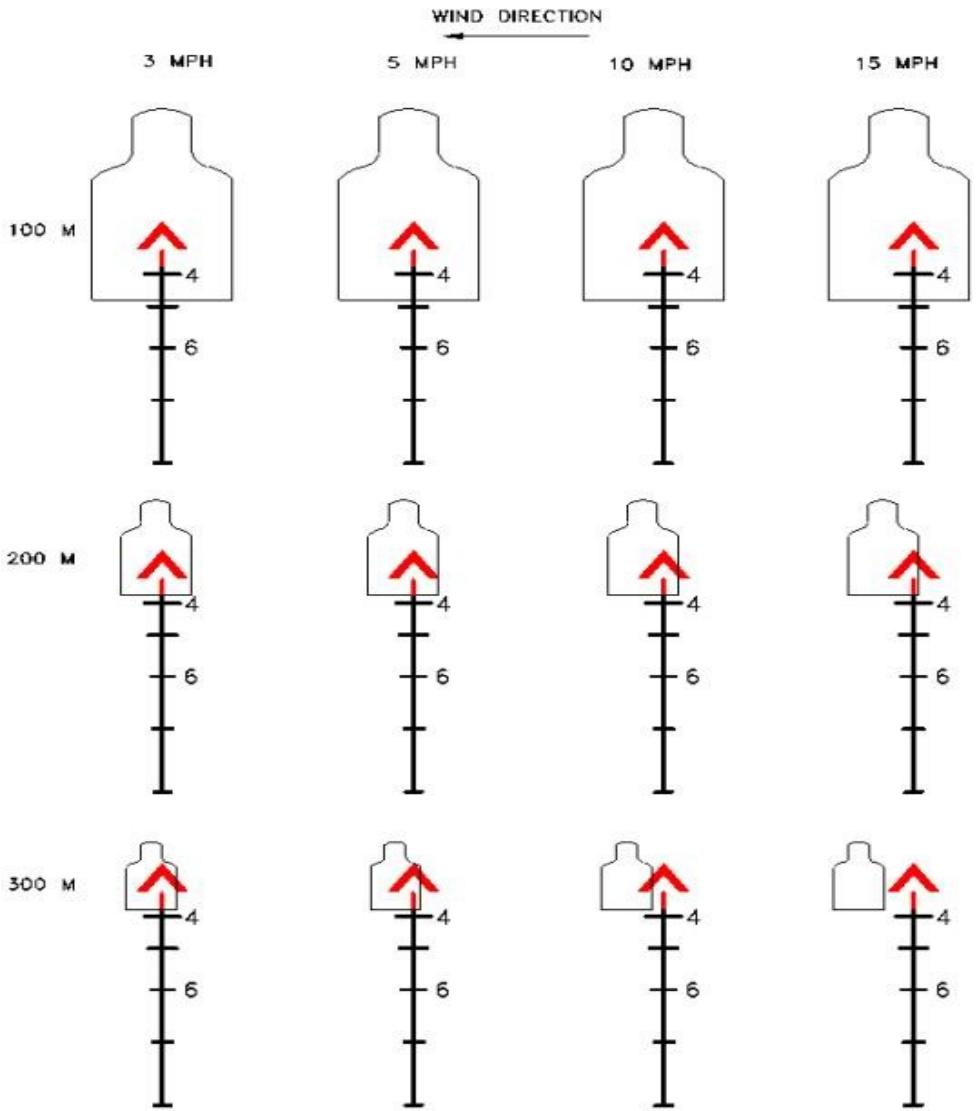

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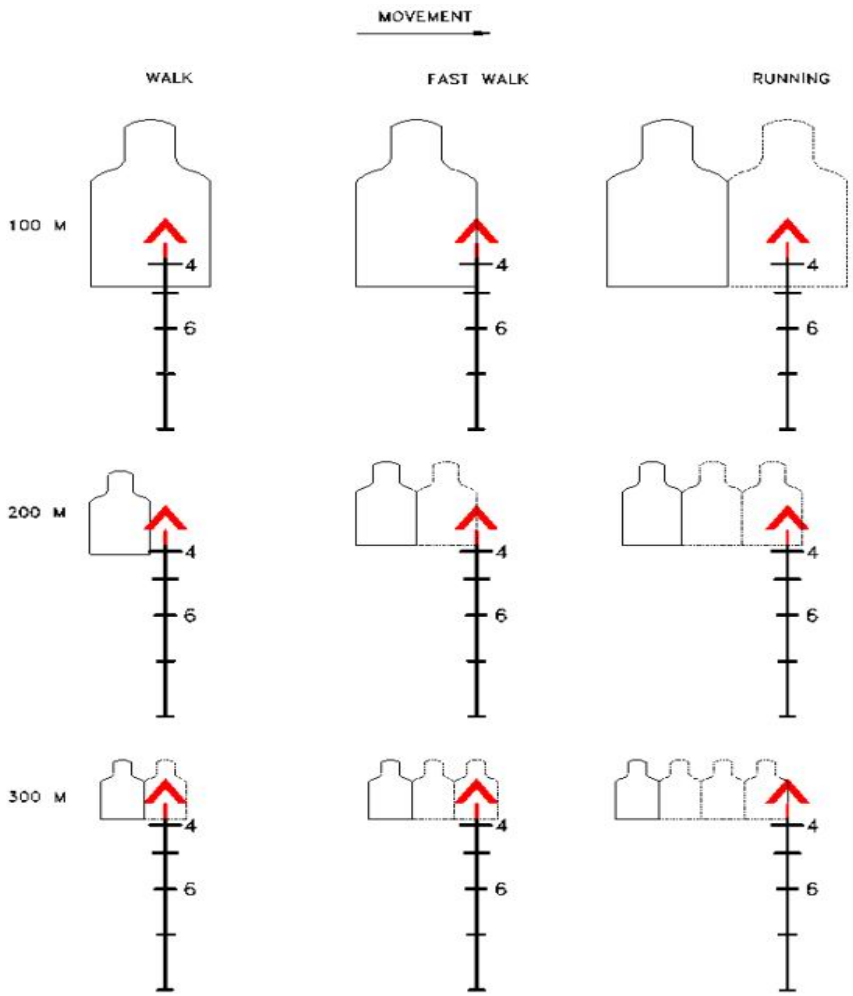

Questions?