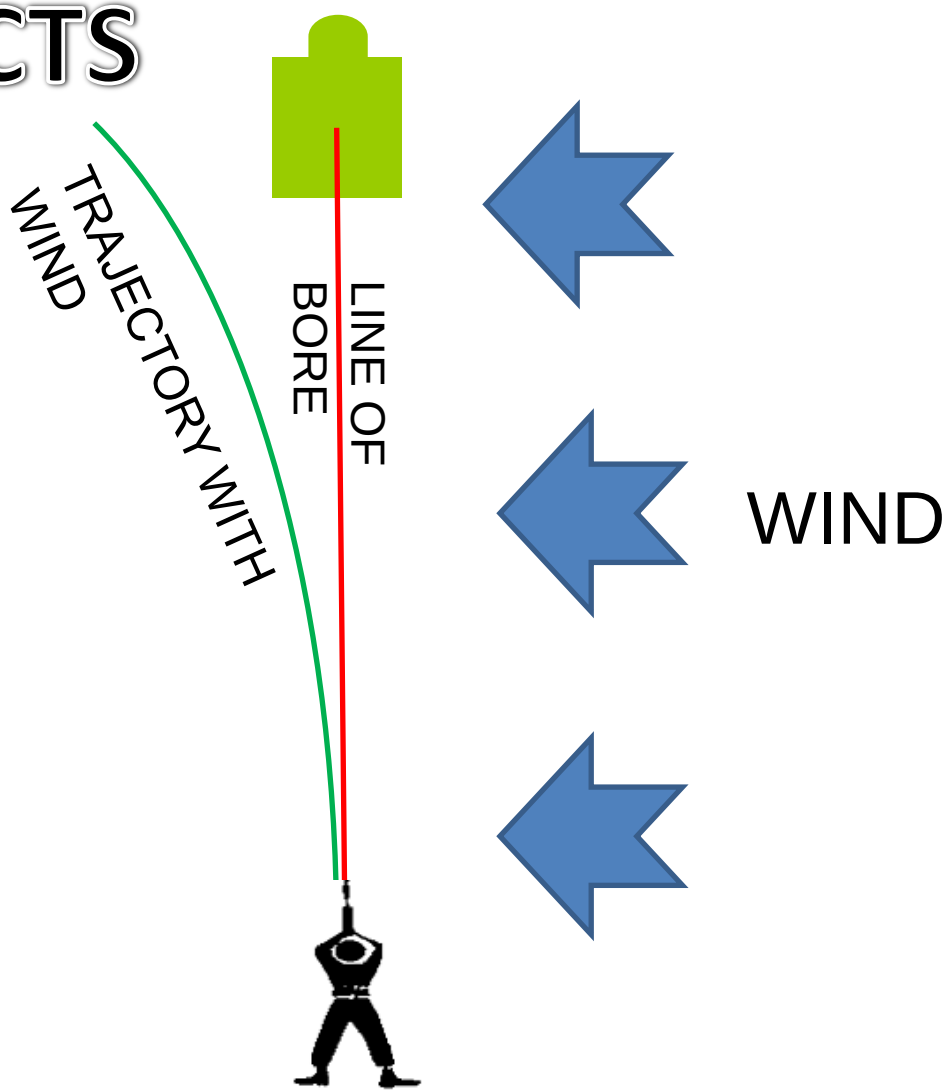
# Wind and Weather

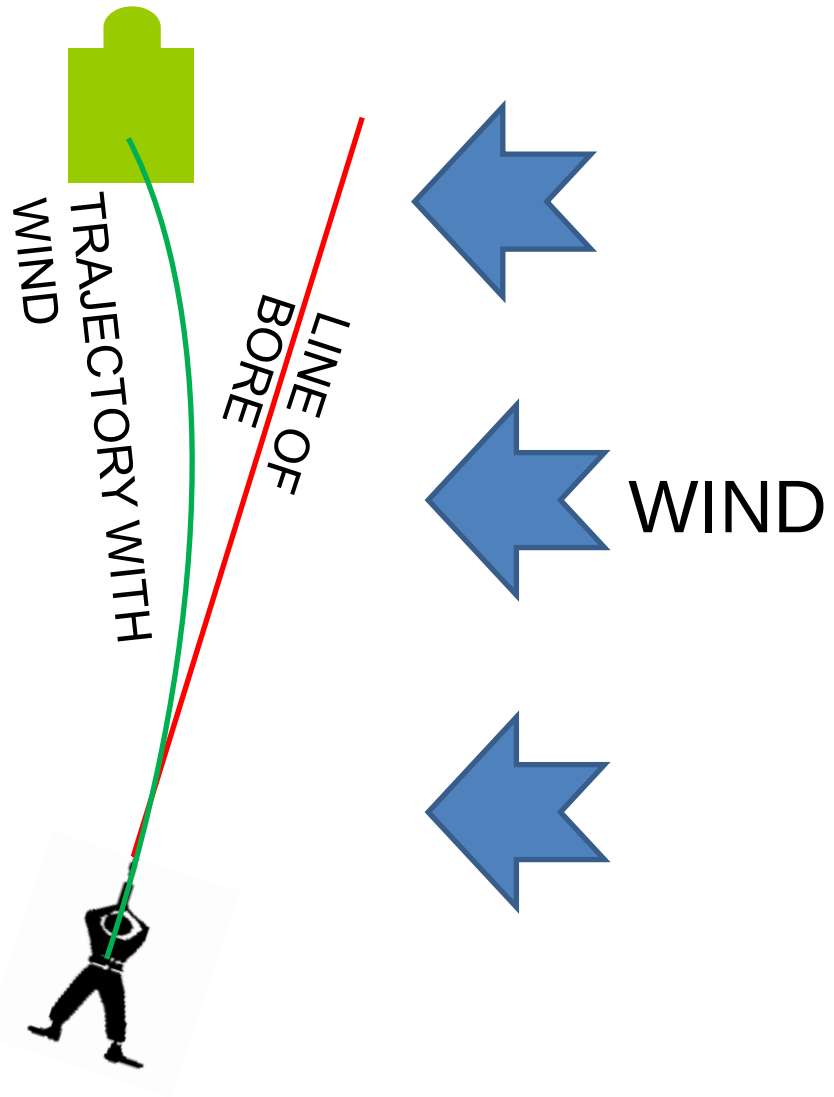
# Wind

- Wind has the greatest VARIABLE 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

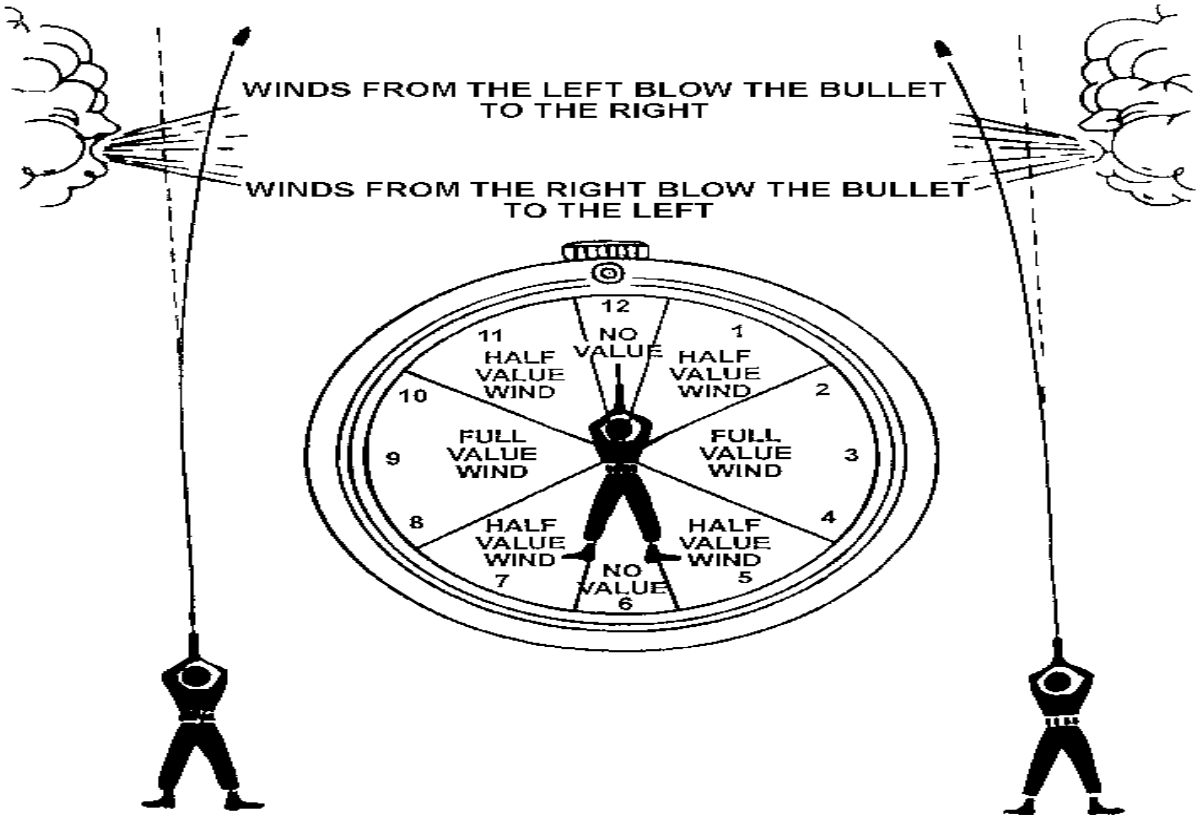
# WIND EFFECTS



# WIND EFFECTS



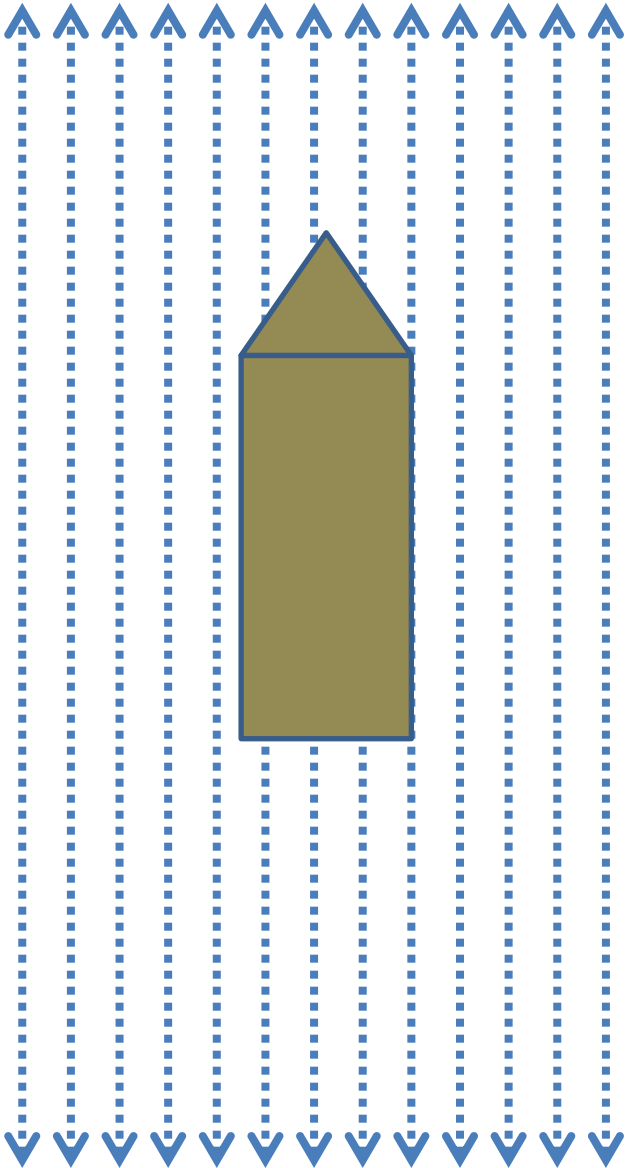
# Wind Direction




## CLOCK SYSTEM

# MASTER MARKSMANSHIP TRAINING COURSE

## NO VALUE WIND



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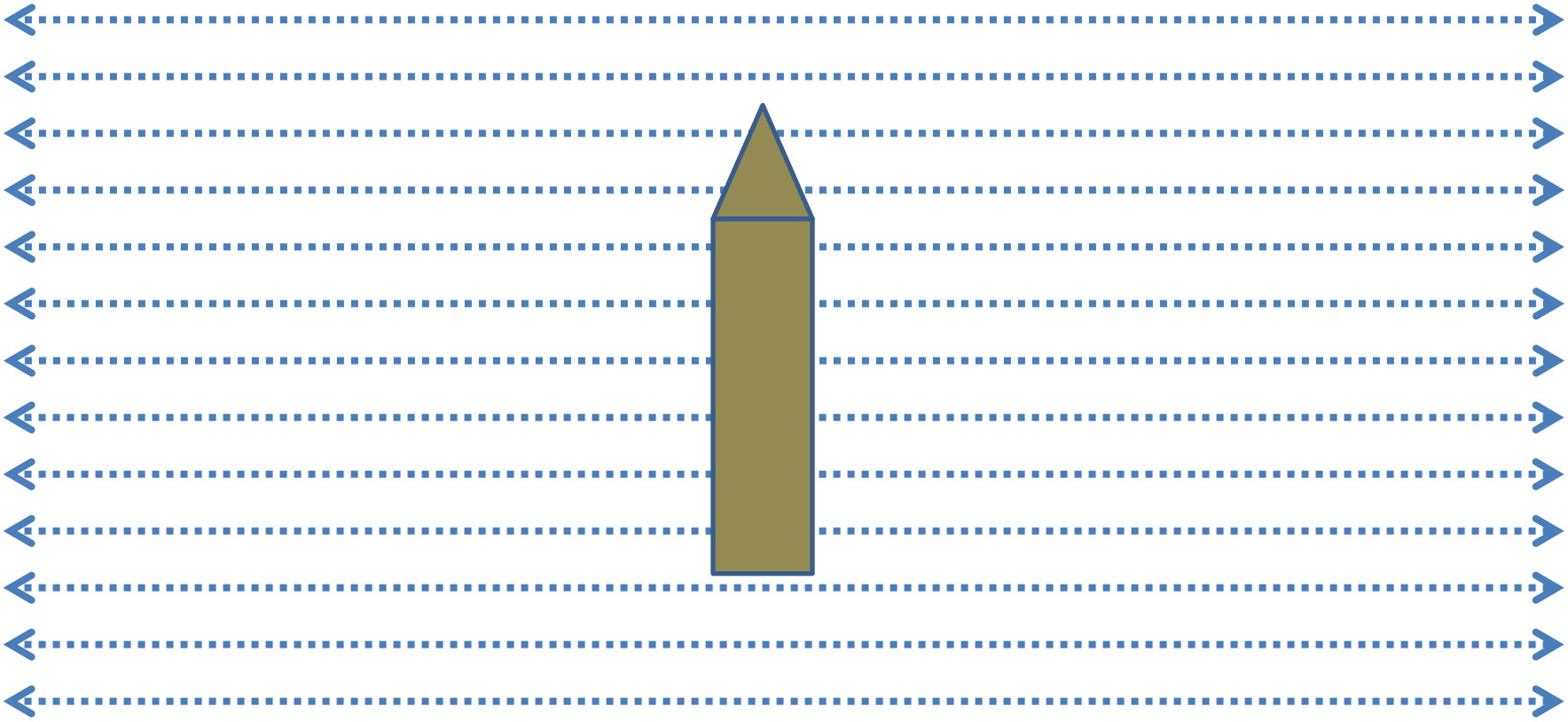
## FULL VALUE WIND



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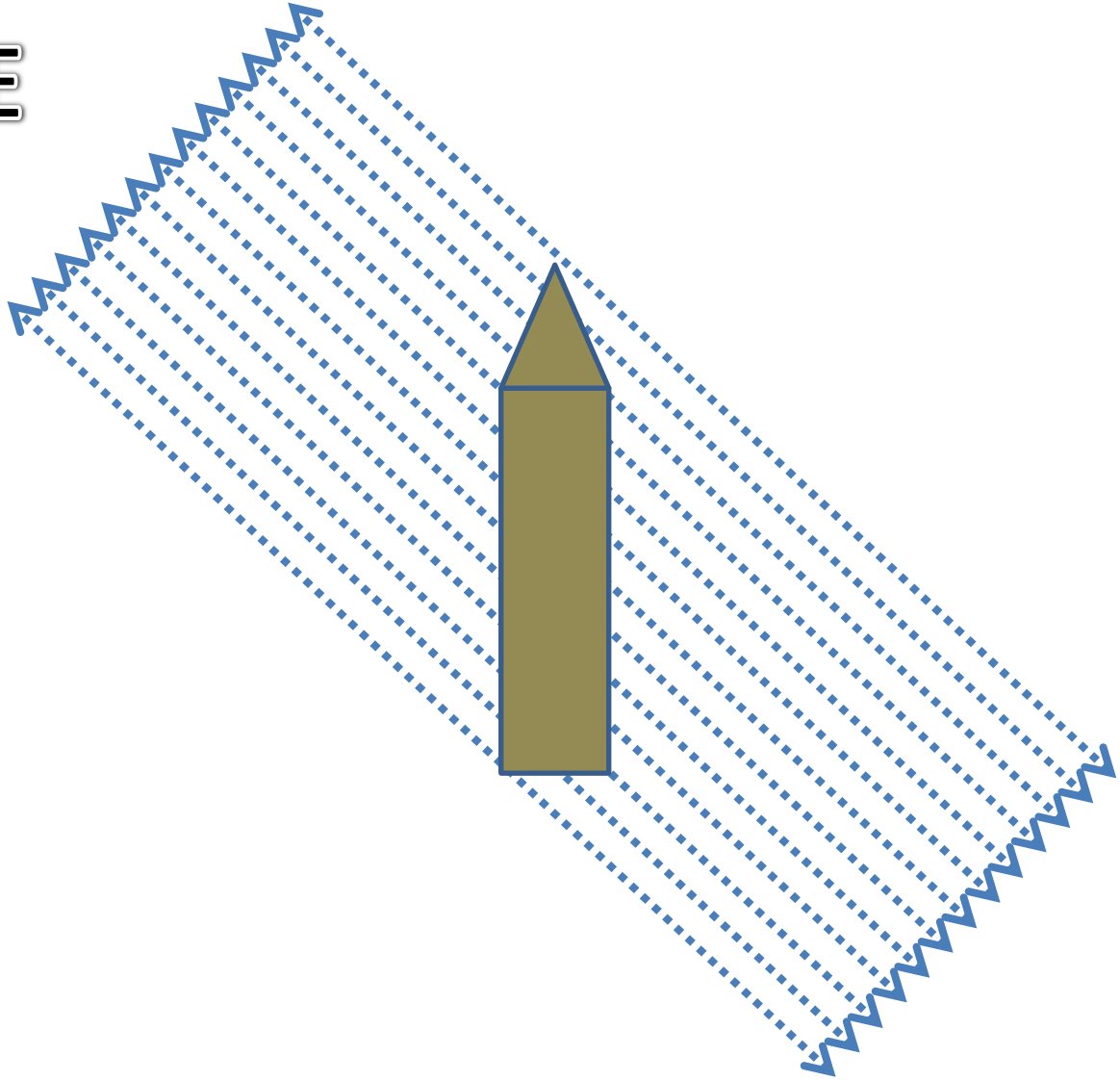
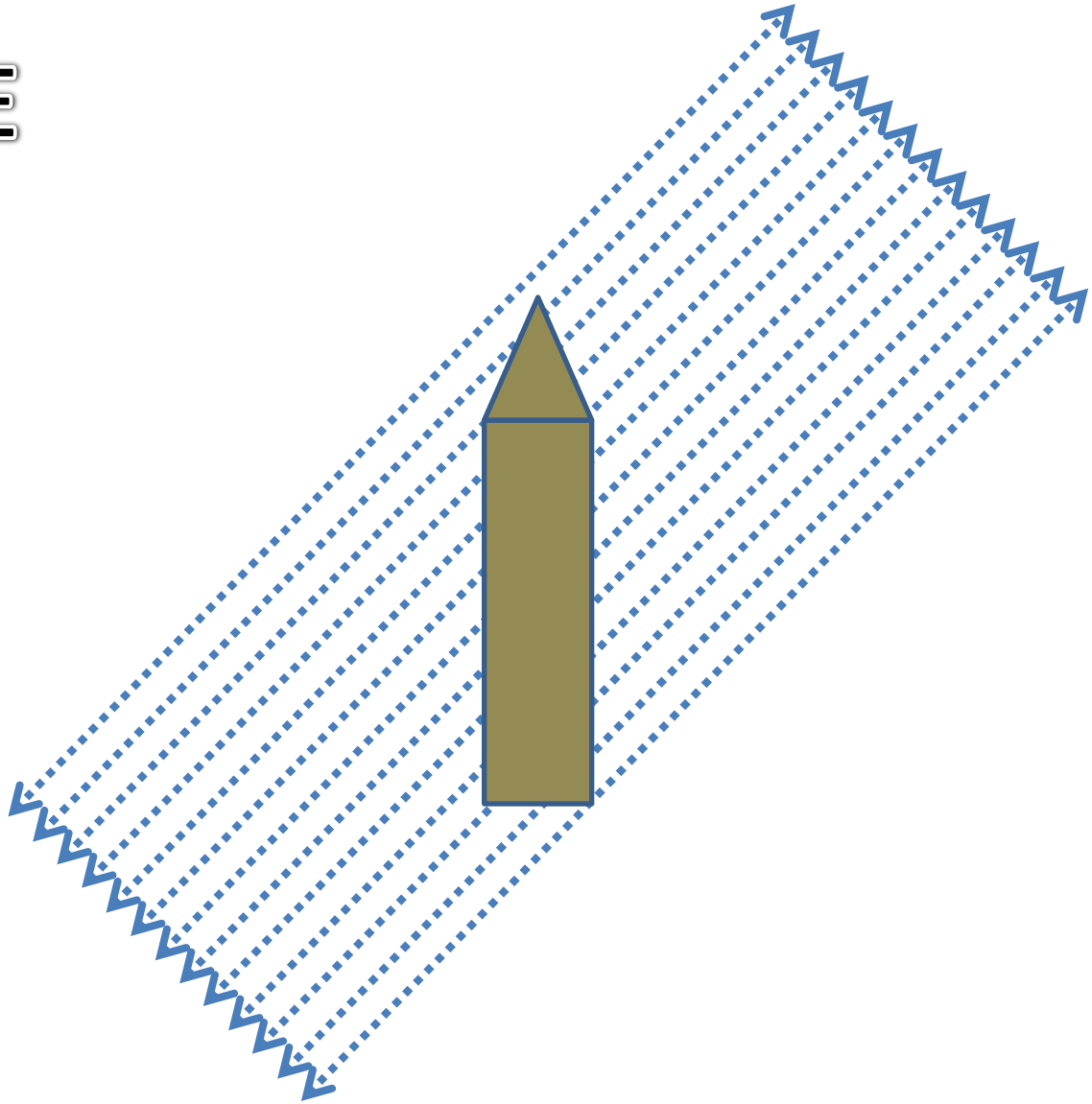
## HALF VALUE WIND



# 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**

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

MASTER MARKSMANSHIP TRAINING COURSE

# Wind Formula Work Sheet

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

| | |
|---|---|
| 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 |

# MASTER MARKSMANSHIP TRAINING COURSE

# Wind Formula Work Sheet

## For half value wind

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

| | |
|---|---|
| 1) 300m @ 10mph | 4.28 (round to 4 MOA) ÷ 2 = 2 MOA |
| 2) 500m @ 7mph | 5 MOA ÷ 2 = 2.5 MOA |
| 3) 600m @ 15mph | 12.85 (round to 13 MOA) ÷ 2 = 6.5 MOA |
| 4) 400m @ 20mph | 11.42(round to 11 MOA) ÷ 2 = 5.5 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.

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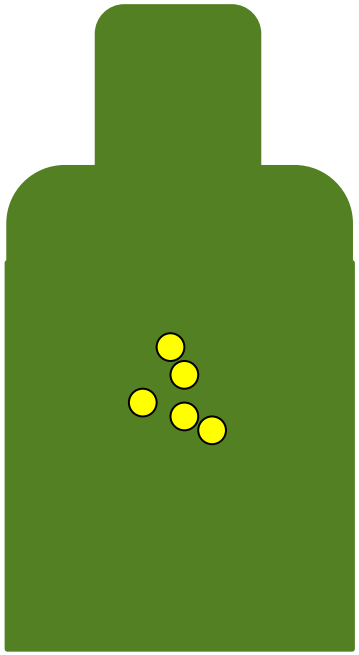
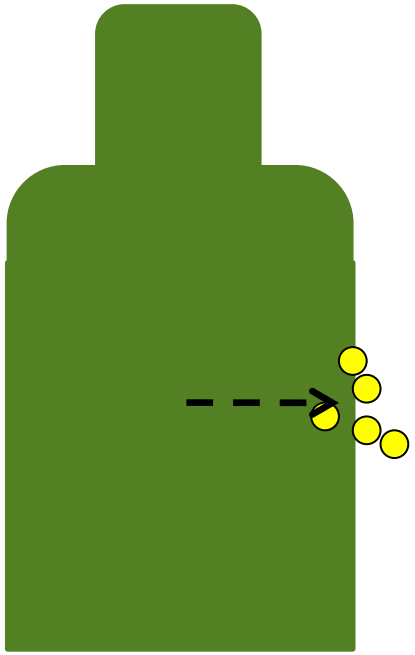
## ZEROING IN WIND

Zeroing at 300 meters in windy conditions.



This applies to zeroing at distance. Not 25 meters.

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



# 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.

# Other Weather Factors

## What this means to you.

If you zero in one location and then go to a drastically different one…reconfirm your zero.

YOUR LIFE MAY DEPEND ON IT!