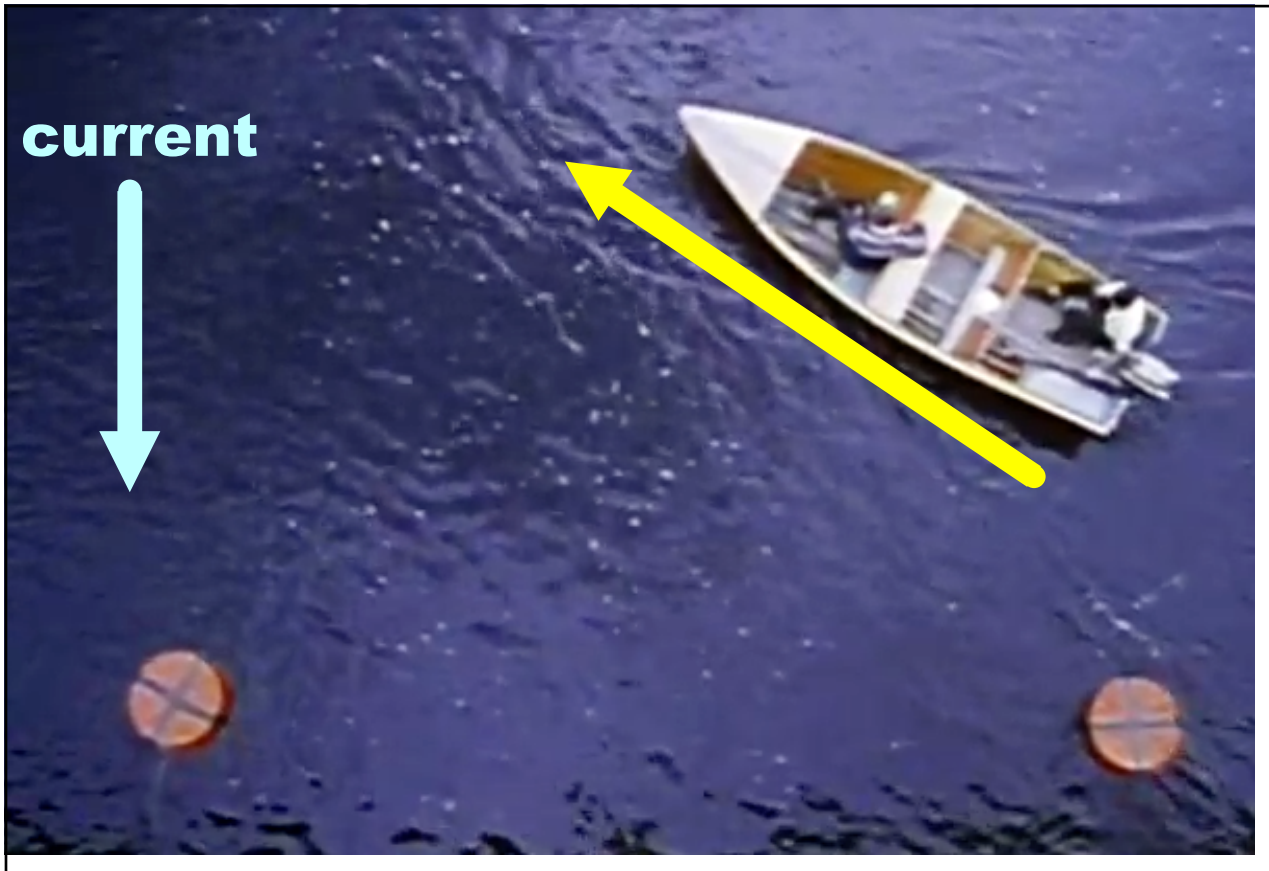
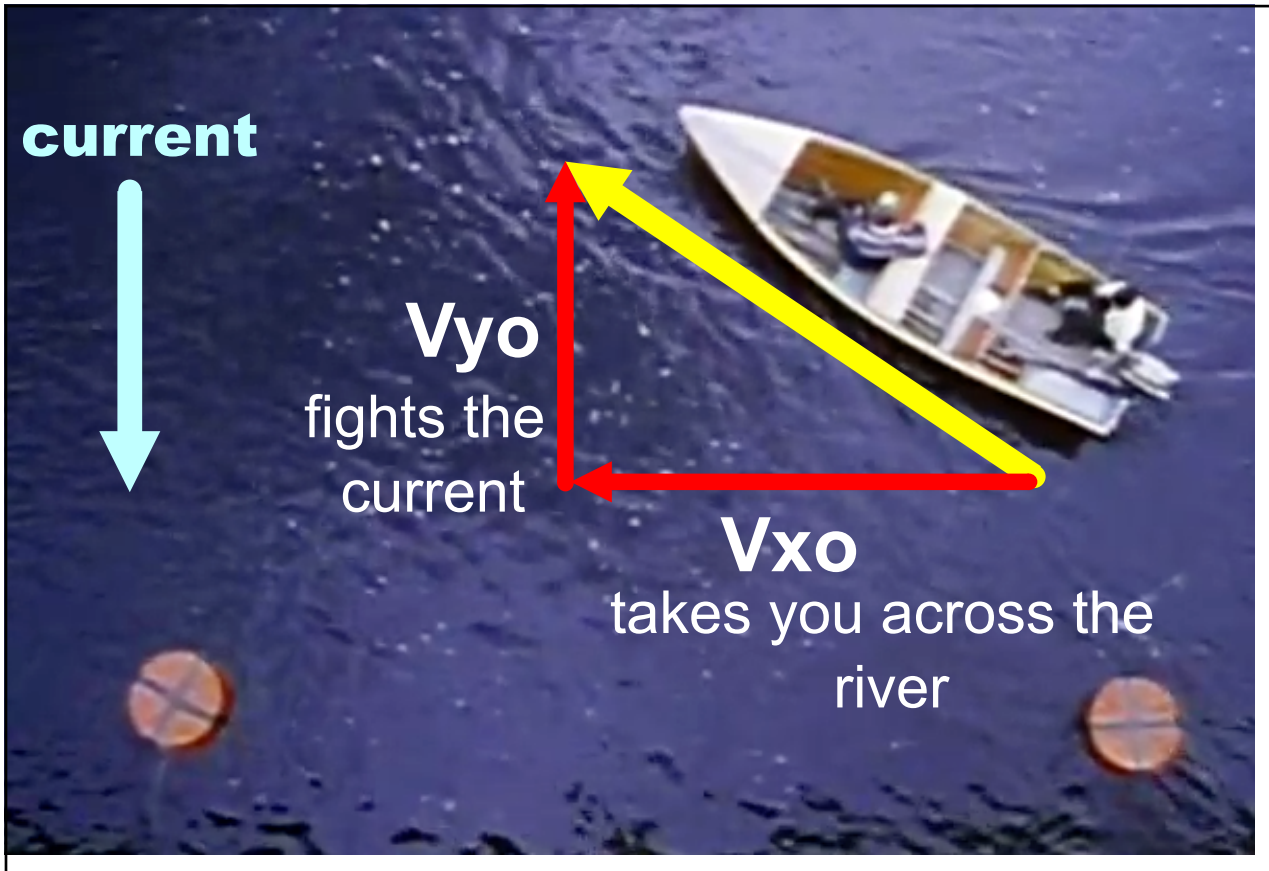
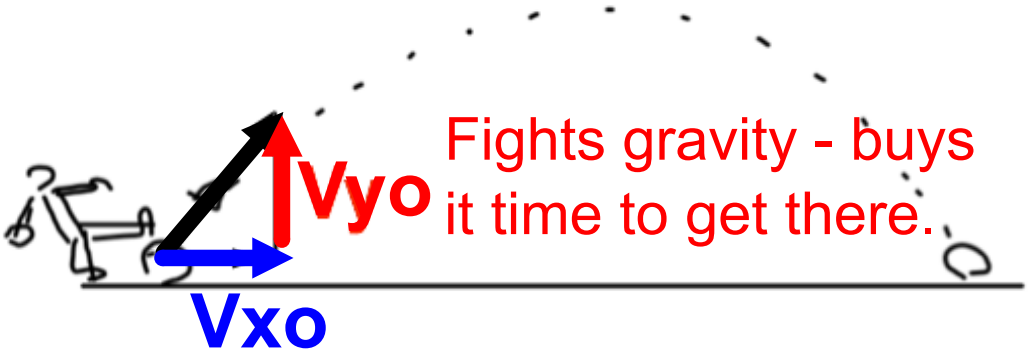

current


current
Vyo
fights the
current
Vxo
takes you across the
river

Vy
fights
gravity
Vx
takes the ball to
the receiver



Fights gravity - buys it time to get there.

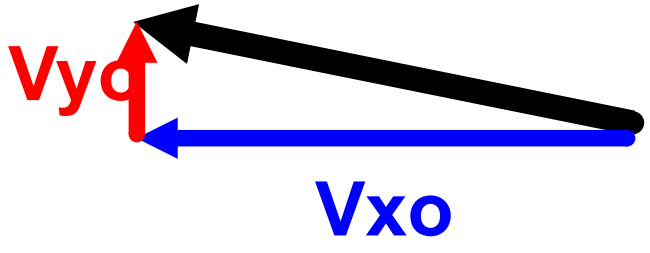
Takes it to the target.

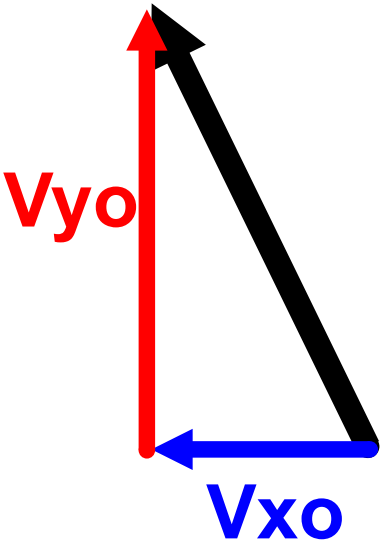
It's a trade off. You're sacrificing some of the velocity to buy time.

Changing the angle:

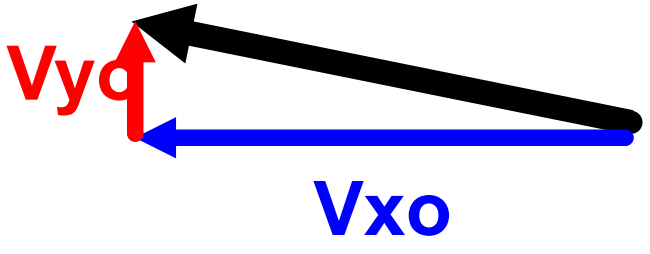
What happens to the range?

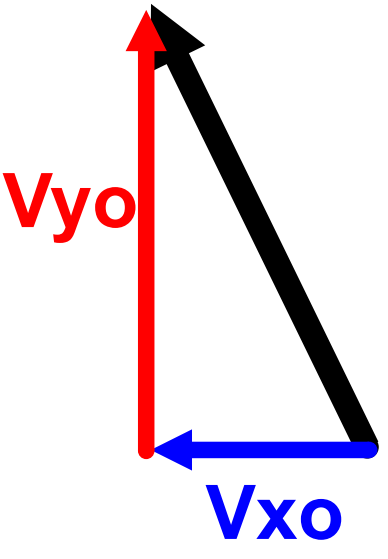
What happens to the time?

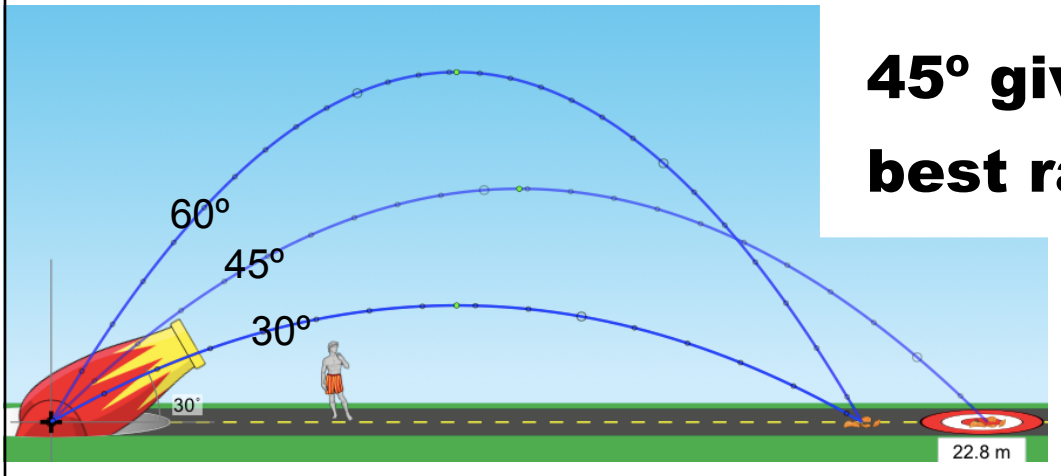




So what angle gives the best range?







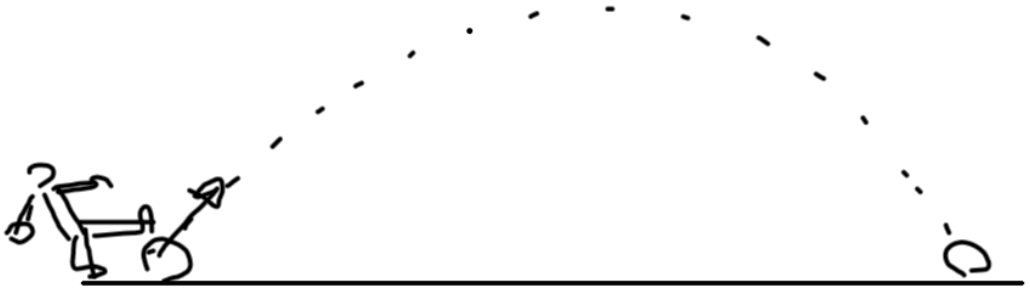
45º gives the best range.

Higher angles take more time to get there.

Complementary angles hit the same spot.

(Range is symmetrical around 45º.)

If this soccer player kicks the ball at 38º and it lands as shown, what would other angles do?



Since it's launches at 38º, this means that it's (45º - 38º = 7º), 7º away from 45º.

Therefore, since it's 7º BELOW 45º, if it's launched 7º ABOVE 45º, it'll land in the SAME SPOT!

52º will make it land in the same spot!

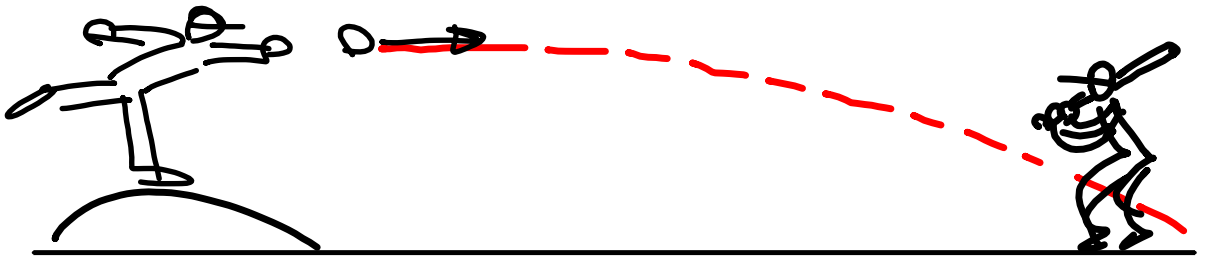
If it's LESS than 7º away, (above or below) 45º, it'll be closer to maximum range angle, so it'll land FURTHER!

greater than 38º and less than 52º will make it travel FURTHER!

If it's MORE than 7º away, (above or below) 45º, it'll be further from the maximum range angle, so it'll land CLOSER!

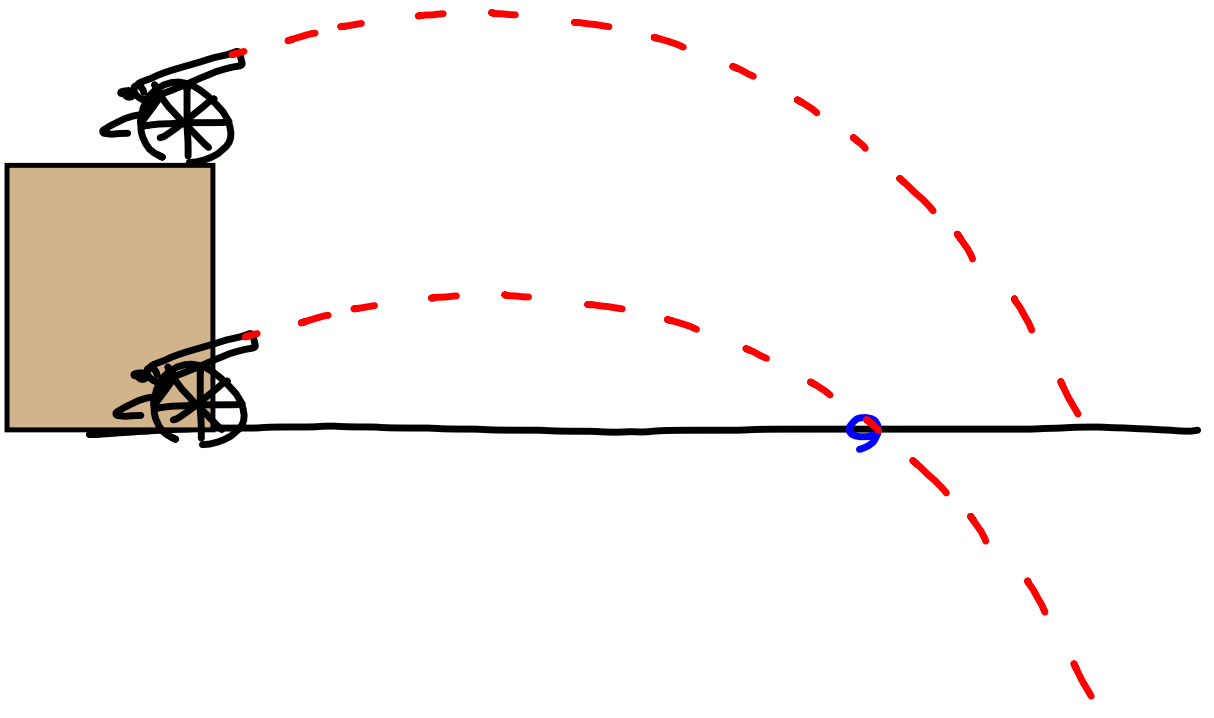
Less than 38º or More than 52º will make it travel LESS FAR!

Pitching - you don't want to sacrifice your Vxo, but it will hit the ground too soon!

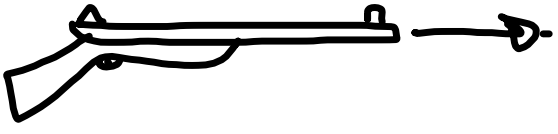


Solution: Put the pitcher on a hill (mound).

Height increases range. Taking and holding hills has always been a military priority.

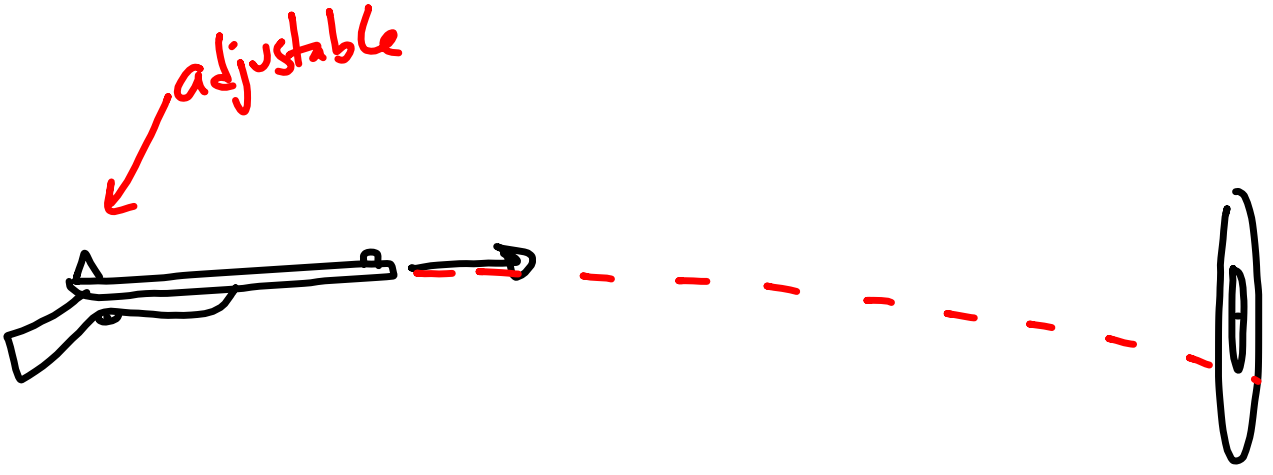


Do all projectiles fall or are bullets an exception?



Are bullets an exception?

NO!



You raise the rear site for distant targets.

That causes you to aim up.

As a Quarterback, you want this angle to be as closer to 45º as possible on deep passes to get range!