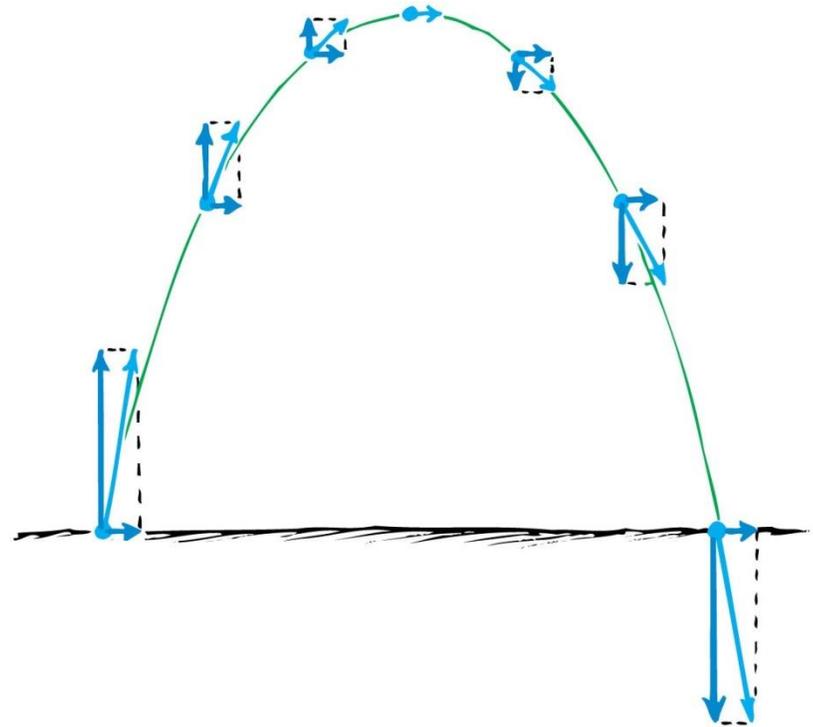
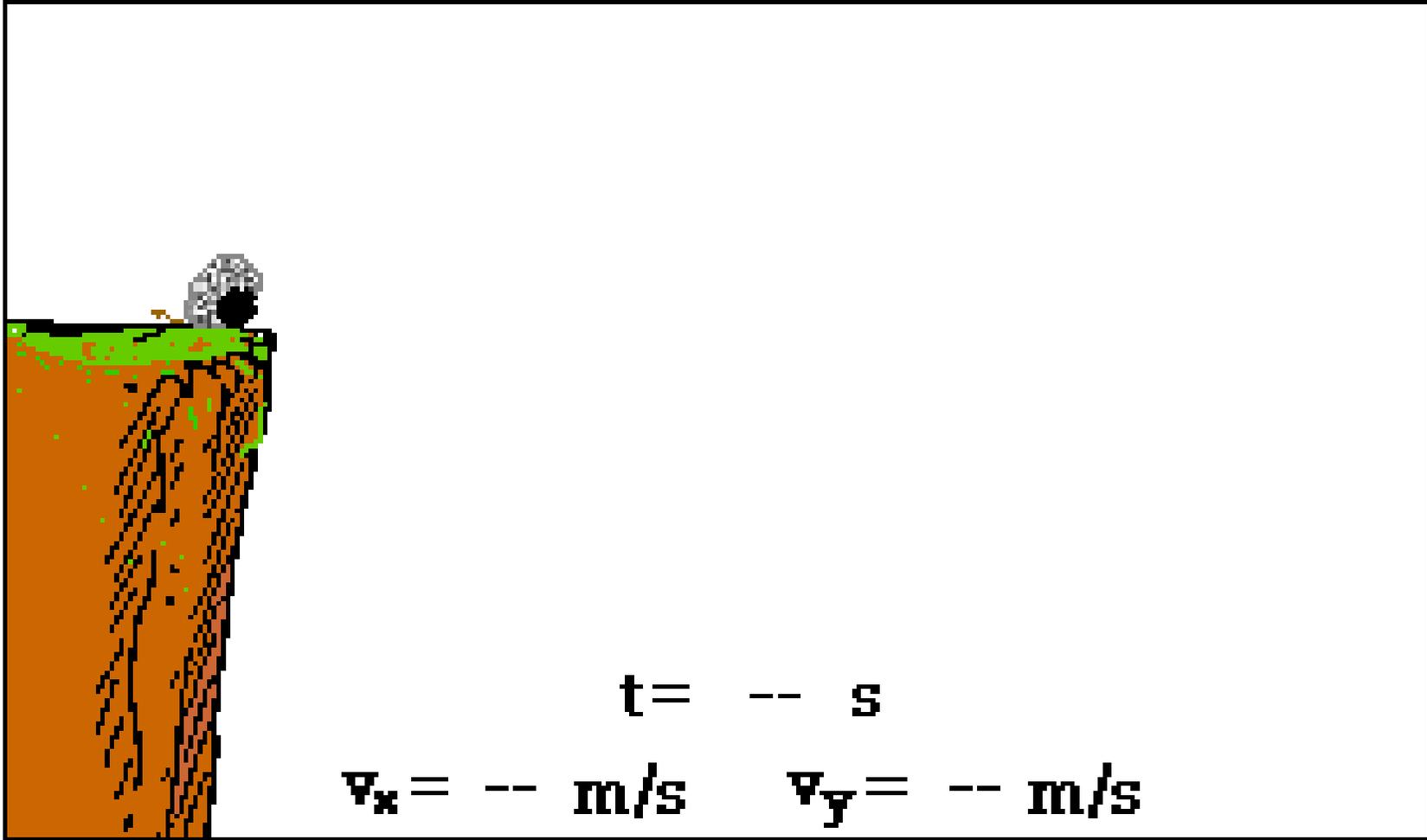


Projectile Motion

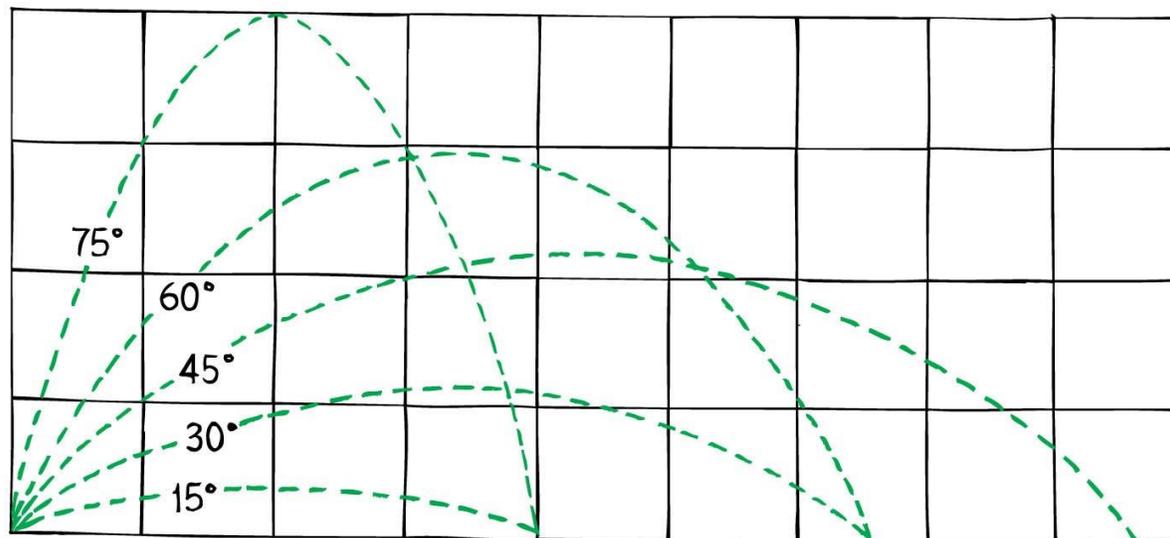
- Projectiles follow a parabolic trajectory
 - Horizontal component along trajectory remains unchanged.
 - Acceleration only occurs in the vertical component





Projectile Motion and Complementary Angles

- Different launch angles result in different horizontal distances traveled by the projectile
 - Same range is obtained from two different launching angles when the angles add up to 90° .
 - Object launched at an angle of 60° has the same range as if it were thrown at an angle of 30° .
 - What launch angle would have the same range as a projectile launched at 20° ?



Angled Projectile Practice

- 1. A baseball player leads off the game and hits a long home run. The ball leaves the bat at an angle of 30.0° from the horizontal with a velocity of 40.0 m/s. How far will it travel in the air?**
- 2. A golfer is teeing off on a 170.0 m long par 3 hole. The ball leaves with a velocity of 40.0 m/s at 50.0° to the horizontal. Assuming that she hits the ball on a direct path to the hole, how far from the hole will the ball land (no bounces or rolls)?**
- 3. A punter in a football game kicks a ball from the goal line at 60.0° from the horizontal at 25.0 m/s.
What is the hang time of the punt?
How far down field does the ball land?**

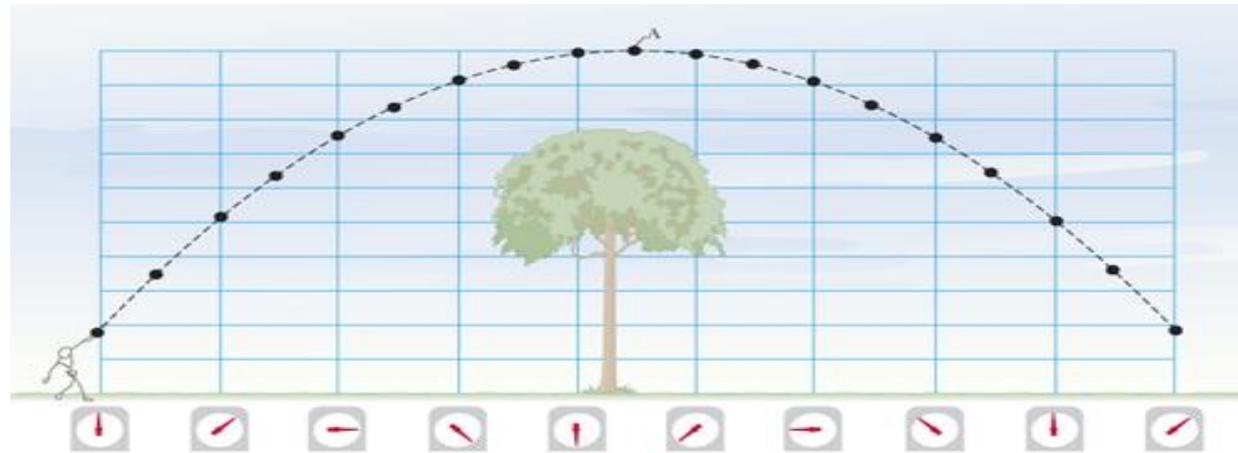
Angled Projectile Practice

At the SMHS vs. Judson football game, the cheerleading squad launches a Rattler t-shirt with the t-shirt shooter into the bleachers from the football field with an initial velocity of 50 m/s at an angle of 40° ?

1. What is the initial velocity of the shirt?
Horizontal
Vertical
2. How long will it take to reach max height?
3. What is the max height?
4. What is the range (how far did it go?)

Review

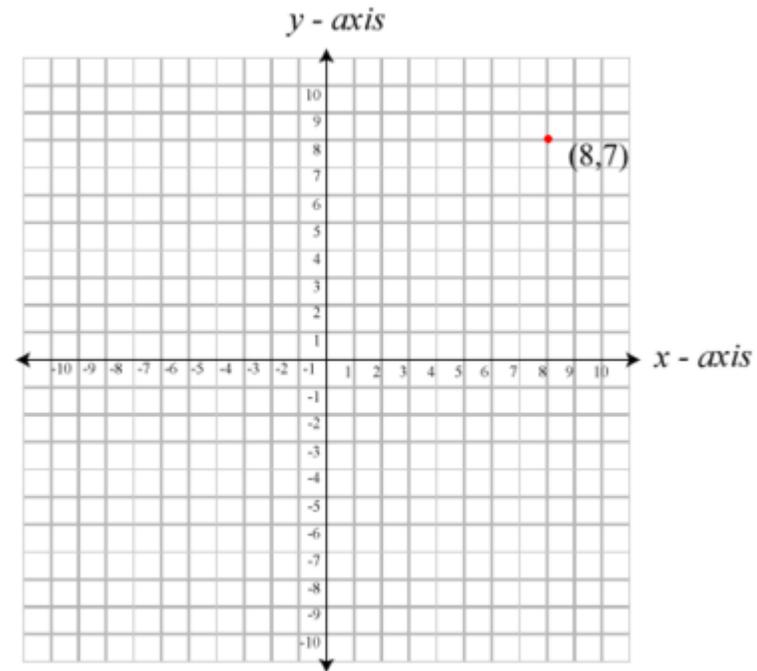
- What is the path of a projectile called?



- Trajectory

Review

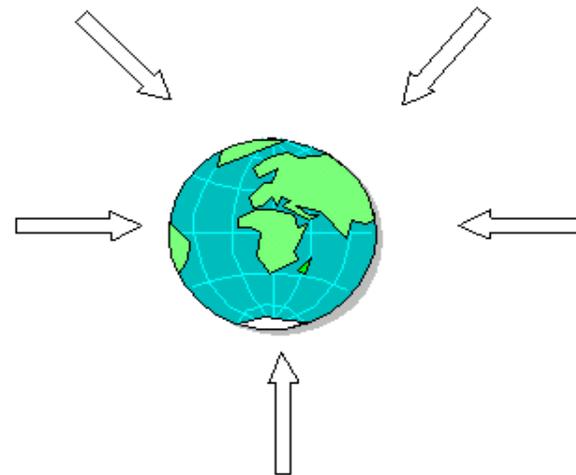
- Is projectile motion one dimensional?



Review

- What force (s) is acting on the projectile?

- Gravity only



Review

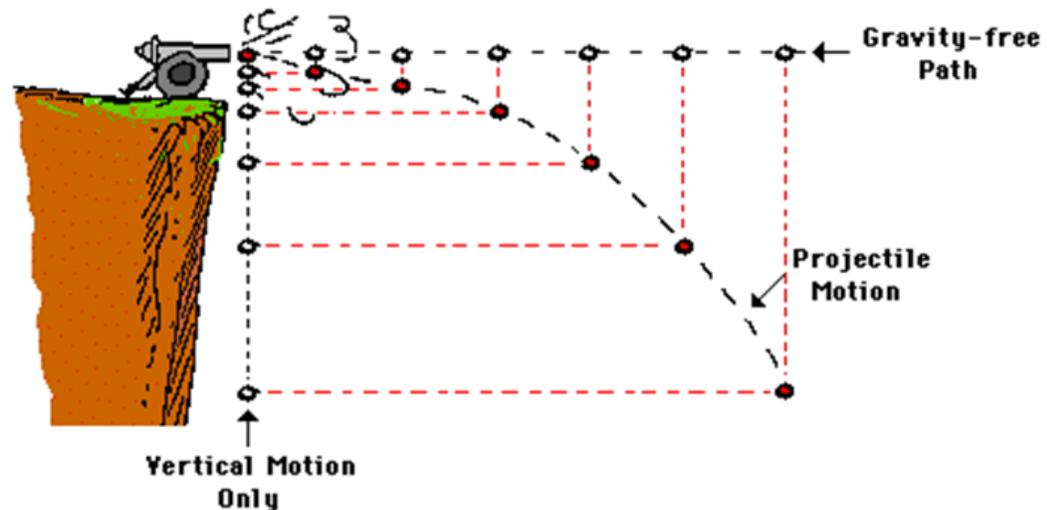
- Which direction, horizontal or vertical has acceleration?
- Vertical
- Which direction, horizontal or vertical has constant speed?
- Horizontal

Review

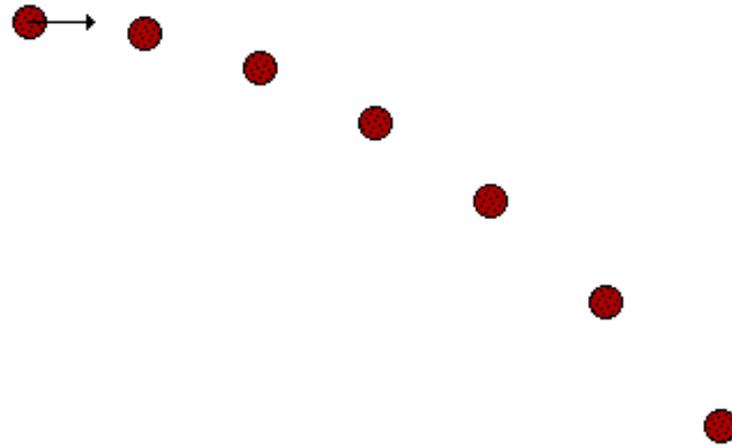
- Two identical balls roll off the edge of a table. One leaves the table travelling twice the speed of the other. Which ball hits the floor first?
- Both hit the ground at the same time. The difference in horizontal velocity does not affect the vertical time.

Review

- At the instant a horizontally pointed cannon ball is fired, a cannonball held at the cannon's side is released and drops to the ground. Which cannonball strikes the ground first, the one fired from the cannon or the one dropped?
- They hit at the exact same time



Draw vector arrows representing the v_x and v_y velocity components during the course of the motion. The length of the arrows should represent the magnitude of the velocity components.



Draw vector arrows representing the v_x and v_y velocity components during the course of the motion.

