1. A hunter is aimed to shoot a monkey with a tranquiller dart for stealing his only source of potassium. The gun is aimed directly at the monkey who lets go right as the gun fires. Why does the dart hit the monkey and not just fly over its head?

2. At what instance is an object considered a projectile?

3. What one word describes the shape of the trajectory that all projectiles follow?

4. How are projectile motion equations valid in the real world if air resistance is being ignored?

5. A projectile is launched at an angle and with an initial velocity of $v_0$.
   a. What variable represents the initial velocity in the x direction?
   b. What is the velocity in the x direction of the projectile at the peak?
   c. What is the velocity in the x direction of the projectile right before it hits the ground?
   d. What is the velocity in the x direction of the projectile at any point on its trajectory?
   e. What would happen to the velocity in the x direction if air resistance was not being ignored?
   f. What variable represents the initial velocity in the y direction?
   g. What is the velocity in the y direction of the projectile at the peak?
   h. How does gravity affect the velocity in the y direction during the entire trajectory?

6. The figure below shows the trajectory of a projectile that was launched at a $55^\circ$ launch angle and an initial velocity of 25 m/s. Draw the trajectory of a projectile that is launched with a launch angle of $35^\circ$ and an initial velocity of 25 m/s using the same axis below.

7. True or False. When a bullet is fired horizontally, it takes the same amount of time to reach the ground as a bullet dropped from rest from the same height. **Explain.**

8. How does the initial trajectory of a baseball influence how you will catch the ball?

9. In archery, should the arrow be aimed directly at the target? How should your aim depend on the distance to the target?
10. The heads of different golf clubs are angled to give the golf ball different initial velocities. Neglecting any air effects, how does changing the initial angle of the ball affect the distance the ball travels?

11. Consider these diagrams in answering the following questions for a projectile launched at an angle. Which diagram might represent...

![Diagrams]

a. The initial horizontal velocity? _____
b. The initial vertical velocity? _____
c. The horizontal acceleration? _____
d. The vertical acceleration? _____

12. Suppose a rescue airplane drops a relief package while it is moving with a constant horizontal speed at an elevated height. Assuming that air resistance is negligible, where will the relief package land relative to the plane? **Explain.**

13. A punter kicks a football to the same height but at various velocities and angles. Rank the following from greatest to least.

![Graph]

a. Rank the paths according to the time of flight.
b. Rank the paths according to the initial vertical velocity.
c. Rank the paths according to the initial horizontal velocity.

14. A softball is hit for a homerun and maintains a constant horizontal velocity as air resistance is negligible. When the ball is at the highest point of its flight, …

a. …its vertical velocity and acceleration are both zero
b. …its vertical velocity is zero but its acceleration is nonzero
c. …its vertical velocity is nonzero but its acceleration is zero
d. …its vertical velocity and acceleration are both nonzero

15. Refer to the figure to the right to answer the following questions.

![Graph]

a. What is the direction of the acceleration at point B?
b. What is the value of the acceleration at any point?
c. At which point(s) is the speed the greatest?
d. At which point(s) is the speed the lowest?
e. At which points is the speed the same?
f. Is the velocity the same at those points?