1. You run off a cliff that is 450m high. Your horizontal velocity is 5m/s. How far from the base of the cliff should you place a cup of water to land in safely? (50m)

2. A marble leaves the track at 3.3m/s and is projected horizontally from a height of 1.75m above the floor. Where should a target be placed so that it will be hit? (2.0m)

3. An inner tube is floating in the water 4.5m below you. How far from you should the inner tube be placed so that you will land on it if you run horizontally off the diving board at 2.5m/s? (2.4m)

4. While fleeing from Avery you run horizontally off a roof with a velocity of 8.0m/s. Will you make it to the roof of the other building that is 5.0m away and 2.5m shorter than the building you are jumping from? (5.7m)

5. Calculate the velocity needed to hit the statue of David that is 8.4m away with the cannon firing horizontally from an elevated height of 16m. Use the simulator to see if you are correct.

<http://phet.colorado.edu/simulations/sims.php?sim=projectile_motion

6. Your cat is stuck in a tree. You try to persuade the cat to jump, but he does not buy your argument that it isn't that far. You are able to throw cat treats with an initial velocity of 8.0m/s at a 75° angle, how high above you is the cat if the treats reach the cat at its peak? (3.0m)

7. After graduation you decide to try a career in daredeviling. Your turbo charged scooter can obtain a speed of 18m/s. The launch ramp is angled at 35°. Where should the end of the jump be located if it is level with the launch ramp so that you land safely? (31m)

8. Calculate the range of the projectile using an initial velocity of 18m/s and the angle specified to your group. Use the simulator to see if you are correct by placing the target at the calculated distance level with the cannon and fire a projectile of your choice.

<http://phet.colorado.edu/simulations/sims.php?sim=projectile_motion

9. Where should a ramp be placed so that a car can jump up to an embankment that is level with the top of the launch ramp?The car is moving at 29m/s (65mph) off a ramp at a $25°$ angle while traveling through the air resistance free air. (66m)

10. A punter kicks the football with an initial velocity of 25m/s at an angle of $65°$. How far does the ball travel in yards? 1m = 1.1yds (54yds)

11. Calculate the range of the projectile using an initial velocity of 18m/s and the angle specified to your group but with the target 10.0m in the air. Use the simulator to see if you are correct by placing the target at the calculated distance 10.0m in the air.

<http://phet.colorado.edu/simulations/sims.php?sim=projectile_motion

12. While fleeing from Avery you jump at an angle of $35°$ with respect to the flat roof while traveling at a velocity of 8.0m/s. Will you make it to the roof of the other building that is 8.0m away and 2.5m shorter than the building you are jumping from? (8.6m)

13. A quarterback throws the football to a stationary receiver who is 31.5m down the field. If the football is thrown at an initial angle of 40.0° to the ground, at what initial speed must the quarterback throw the ball for it to reach the receiver, if the ball is caught at the same level it was thrown? (17.7m/s)