



The Hobby Shop: Catapult Module

Explore Balloon Blast!

Instructor MASTER

Name _____ Date _____ Period _____

Directions:

Go to Hobby Shop and play Balloon Blast. Adjust the velocity and angle of the projectile to answer the following questions. Use **Table 1** below to keep track of your findings.

Questions:

1. Of the choices below, what angle causes the balloon to have the greatest range?

- a) 10
- b) 45
- c) 60
- d) 90

2. What angle causes the balloon to travel the highest? Why?

90 degrees causes the balloon to travel the highest because all of the velocity is in the vertical direction or straight up.

3. Which angle between 0 and 90 degrees would cause the balloon to have the most total time in the air?

Given the same initial velocity, the balloon will have the longest time in the air at an angle of 90 degrees.

4. Of the choices below, which balloon will be in the air longest?

- a. The one with the farthest range
- b. The lightest balloon
- c. *The one fired at the highest angle*

5. Complete the following sentence:

The vertical velocity of a balloon fired from the catapult (increases/decreases/stays the same) until it reaches its apex. At its apex the balloon's vertical velocity is 0 m/s. As it falls back to the ground the vertical velocity (increases/decrease/stays the same) until it reaches the ground.

6. Given the constant and single force of gravity, what is acceleration of the balloon just before it hits the ground?

9.81 m/s²

TABLE 1:

	Angle	Velocity	Range	Height (total)	Max. Height	Time
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

7. What are some combinations of angle and velocity that will make the balloon hit each target? Answer the question by completing Table 2.

TABLE 2:

	Angle	Velocity
Target 1		
Target 2		
Target 3		
Target 4		
Target 5		