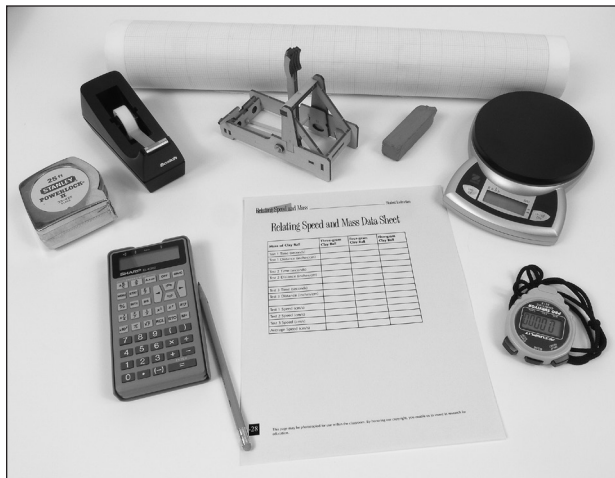


Quick View

Calculate the speed of varying-sized clay balls launched from the catapult.

Materials

- “Relating Speed and Mass Data Sheet”
- Pencil
- Calculator
- Built Pitsco Catapult
- Modeling clay
- Digital scale or digital balance
- Stopwatch
- Tape measure
- Pitsco Range Paper
- Tape



Procedure

1 Locate the block of modeling clay. Using the modeling clay, construct three clay balls, each having a mass of three grams, four grams, and five grams, respectively. Measure the mass of each clay ball using the digital scale or digital balance and record these numbers in the “Relating Speed and Mass Data Sheet.”

2 Find an area where the test can be conducted. Roll out approximately six meters of the Pitsco Range Paper and tape the corners of the paper to the surface (floor) to hold it in place. Make a straight line, across the width of the paper, about 30 centimeters from one end.

3 Line up the front of the catapult with the line on the Range Paper. This launch position will act as a measuring point for each firing sequence. Make sure to place the catapult on this line before every launch to obtain accurate measurements.

4 Lock the firing arm into the launch position using the trigger. Load the three-gram clay ball onto the firing arm scoop. Using the stopwatch, measure the total amount of time from the release of the trigger to the landing of the clay ball. Record this time in the Test 1 Time field on the “Relating Speed and Mass Data Sheet.”

5 After the first launch is completed, the clay ball should leave a small mark upon the Range Paper. Label this mark appropriately such as “three grams – 1st launch.”

6 Repeat this testing process for each clay ball three times, making sure to record the time as well as label the markings appropriately. Three launches will provide enough data to calculate the average speed of each clay ball.

7 After all of the tests have been completed, use the tape measure to measure the distance, in inches, between the launch position line and the landing point of each test. Fractional measurements should be converted to decimal form. For example, 37-3/4" should read as 37.75". Record these measurements in the corresponding fields of the “Relating Speed and Mass Data Sheet.”

8 Using the recorded data, convert all of the distance measurements to centimeters. (**Note:** one inch equals 2.54 centimeters.)

9 Calculate the speed of each test by dividing the distance in centimeters by the travel time of each clay ball. Record the speed of each clay ball in the corresponding fields of the “Relating Speed and Mass Data Sheet.” Your answers should be expressed in centimeters per second (cm/s).

10 Calculate the average speed of each test. Record these averages to complete the “Relating Speed and Mass Data Sheet.”

Relating Speed and Mass Data Sheet

	Three-gram Clay Ball	Four-gram Clay Ball	Five-gram Clay Ball
Test 1 Time (seconds)			
Test 1 Distance (cm)			
Test 2 Time (seconds)			
Test 2 Distance (cm)			
Test 3 Time (seconds)			
Test 3 Distance (cm)			
Test 1 Speed (cm/s)			
Test 2 Speed (cm/s)			
Test 3 Speed (cm/s)			
Average Speed (cm/s)			