PART I

1st Trial:

Elevation: 12 meters

Time: 1.56 seconds

2nd Trial:

Elevation: 13 meters

Time: 1.63 seconds

3rd Trial:

Elevation: 15 meters

Time: 1.75 seconds

Acceleration Due to Gravitational Force:

v = ?

v = gt

1st Trial –

t = 1.56 s, g = -9.8 m/s^2

v = (-9.8 m/s^2)(1.56 s) = -15.288 m/s

v = -15 m/s

15 m/s down

2nd Trial –

t = 1.63 s, g = -9.8 m/s^2

v = (-9.8 m/s^2)(1.63 s) = -15.974 m/s

v = -16 m/s

16 m/s down

3rd Trial –

t = 1.75 s, g = -9.8 m/s^2

v = (-9.8 m/s^2)(1.75 s) = -17.15 m/s

v = -17 m/s

17 m/s down

PART II

1st Trial:

Scenario: Folded paper on top of book, dropped from waist high.

Observations: Paper remained on top of book throughout entire duration of fall.

2nd Trial:

Scenario: Book in one hand, folded paper in the other, both dropped simultaneously.

Observations: Book fell at a much faster rate than the paper, and hit the ground before the paper did.

The main thing I noticed during these two trials was that the paper fell to the ground much faster when it was on top of the book, as compared to the second trial when it was dropped separately (as flat). The book fell at the same rate both times. This occurs because there is no air resistance acting on the paper, since it is on top of the book; however, there is when the paper is dropped by itself. In short, the paper falls with the book when on top of it.

3rd Trial:

Scenario: Dropping flat and crumpled paper together simultaneously, followed by crumpled paper and book simultaneously.

Hypothesis #1: If the paper is crumpled tightly into a ball, then it will fall to the ground at the same rate as the book with the flat piece of paper on top of it.

Hypothesis #2: If the paper is crumpled tightly into a ball, then it will fall to the ground faster than the flat piece of paper by itself.

Observations: The crumpled paper fell to the ground as fast as the book with the paper on top did, while the flat piece of paper fell to the ground slower than the crumpled paper did.

Conclusion:

After all 3 trials, I noticed that the paper fell much faster to the ground when there was a lot less air resistance acting upon it, such as during trial 1 and for what was seen during trial 3. In trial 1, since the paper was on top of the book, the book significantly lowered the air resistance towards the paper, allowing it to fall with it. This can be seen when trial 2 came around, as the paper fell to the ground much slower than the book when dropped separately. This is due to the fact that the book was not there to lower that air resistance. In trial 3, it was also seen when the crumpled paper was dropped along with the book that had the paper on top. This is similar to trial 2, however since the paper was crumpled, there is less surface being exposed to the air. Because of this the air resistance is much lower, just like in trial 1 except without the book underneath it. My observations during these trials support my hypotheses, as the crumpled paper fell faster than the flat paper, and the book with paper and crumpled paper fell at the same rate.