Freefall Worksheet

Work the Draw a box around your answers.

$g = 10\ m/s^2$

1. I drop a penny from the top of the tower at the front of Fort Collins High School and it takes 1.85 seconds to hit the ground. Calculate the velocity in m/s after 1.10 seconds of freefall and calculate the velocity at impact in mi/hr.

2. If I drop a watermelon from the top of one of the tower dorms at CSU, and it takes 3.34 seconds to hit the ground, calculate how tall the building is in meters and then convert into feet.

3. You are walking in Paris alongside the Eiffel Tower and suddenly a croissant smacks you on the head and knocks you to the ground. From your handy dandy tourist guidebook you find that the height of the Eiffel Tower is 300.5 m. If you neglect air resistance, calculate how many seconds the croissant dropped before it tagged you on the head.

4. During the latter part of your European vacation, you are hanging out at the beach at the gold coast of Spain. As you are laying in your chaise lounge soaking up the warm Mediterranean sun, a large glob of seagull poop hits you in the face. Since you got an "A" in ICPE you are able to estimate the impact velocity at 98.5 m/s. Neglecting air resistance, calculate how high up the seagull was flying when it pooped.

5. If you were to throw a large log over the edge of the Grand Canyon and it took 5.65 seconds to hit the ground, calculate the velocity of the log at impact in m/s and calculate the distance the log fell in feet.

Freefall-Acceleration due to Gravity

6. A tourist drops a rock from rest from a guard rail overlooking a valley. What is the velocity of the rock at 4.0 s? What is the displacement of the rock at 4.0 s?

7. Suppose the tourist in question #1 instead threw the rock with an initial velocity of 8.0 m/s [down]. Determine the velocity and displacement of the rock at 4.0 s (Remember the v_i is down and must become a -8.0 m/s)

8. Suppose the tourist in question #1 instead threw the rock with an initial velocity of 8.0 m/s [up]. Determine the velocity and displacement of the rock at 4.0 s (Remember the v_i is up and must become a +8.0 m/s)

9. A college student wants to toss a textbook to his roommate who is leaning out of a window directly above him. He throws the book upwards with an initial velocity of 8.0 m/s. The roommate catches it while it is travelling at 3.0 m/s [up].

a) How long was the book in the air?
b) How far vertically did the book travel?
c) Redo the problem, and have the roommate catch the book as it is travelling 3.0 m/s [down]. What is the time and displacement now? Do you notice anything?

10. A man is standing on the edge of a 20.0 m high cliff. He throws a rock vertically with an initial velocity of 10.0 m/s.
a) How high does the rock go? (Remember that at its max height v = 0 m/s)
b) How long does it take to reach its max height?

1. -11.0 m/s -41.3 mi/hr
2. - 55.8m -183ft
3. 7.8s
4. 485m
5. -56.5m/s
6. -40m/s -80m
7. 48 m/s -112m
8. -32m/s
9. a) 0.5s b) 2.75m c) 1.1s 2.75m
10. a) 5m b)1s