

Freefall Worksheet

Work the problems using the following equations. Draw a box around your answers.

$$g = 10 \text{ m/s}^2$$

$$v = g t$$

$$d = \frac{1}{2} g t^2$$

1. You drop a penny from the top of the bleachers at Panther Stadium 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.
2. If you drop a watermelon from the top of one of the tower dorms at MU-Columbia, and it takes 3.34 seconds to hit the ground, calculate how tall the building is in meters and then convert into feet.
[Hint: 3.2 feet = 1 meter]
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 lounge chair soaking up the warm Mediterranean sun, a large glob of seagull poop hits you in the face. 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.
[Hint: 3.2 feet = 1 meter]

Freefall Problems

1. An object, initially at rest, falls freely near the earth's surface. How long does it take the object to reach a speed of 98 m/s?
2. A rock is dropped from a cliff. Approximately how long does it take to fall 45 m?
3. What is the speed of a rock, initially at rest, that has fallen 66 m near the Earth's surface?
4. An astronaut drops a rock from rest on the Moon's surface. How far will the rock fall in 2.0 s? (Acceleration due to gravity on the Moon is 1.6 m/s^2)
5. A student drops an object from the top of a building which is 19.6 m high. How long does it take the object to fall to the ground?
6. An object is allowed to fall freely near the surface of a planet. The object falls 54 m in the first 3.0 s. The acceleration due to gravity on that planet is _____
7. A clam dropped by a sea gull takes 3.0 s to hit the ground. What is the sea gull's approximate height above the ground at the time the clam was dropped?