

Gravity and Acceleration

The acceleration of a freely falling body is 9.8 m/s/s (or 9.8 m/s^2) due to the force of gravity.

Using the formula $a = \frac{v_f - v_i}{t}$, we can calculate the velocity of a falling object at any time if the initial velocity is known.

Example: What is the velocity of a rubber ball dropped from a building roof after 5 seconds?

$$9.8 \text{ m/s}^2 = \frac{v_f - 0}{5 \text{ s}}$$
$$v_f = 49 \text{ m/s}$$

Solve each problem.

1. What is the velocity of a quarter dropped from a tower after 10 s?
2. If a block of wood dropped from a tall building has attained a velocity of 78.4 m/s , how long has it been falling?
3. If a ball that is freely falling has attained a velocity of 19.6 m/s after 2 s, what is its velocity 5 s later?
4. A piece of metal has attained a velocity of 107.8 m/s after falling for 10 s. What is its initial velocity?
5. How long will it take an object that falls from rest to attain a velocity of 147 m/s ?