

Force and Acceleration

A **force** is a push or a pull. To calculate force, we use the following formula:

$$F = ma \quad \text{where } F = \text{force (N)}$$
$$m = \text{mass (kg)}$$
$$a = \text{acceleration (m/s}^2\text{)}$$

Example: With what force will a rubber ball hit the ground if it has a mass of 0.25 kg?

$$F = (0.25 \text{ kg})(9.8 \text{ m/s}^2)$$

$$F = 2.45 \text{ N}$$

Solve each problem.

1. With what force will a car hit a tree if the car has a mass of 3,000 kg and it is accelerating at a rate of 2 m/s²?
2. A 10-kg bowling ball would require what force to accelerate it down an alleyway at a rate of 3 m/s²?
3. What is the mass of a falling rock if it hits the ground with a force of 147 N?
4. What is the acceleration of a softball if it has a mass of 0.50 kg and hits the catcher's glove with a force of 25 N?
5. What is the mass of a truck if it is accelerating at a rate of 5 m/s² and hits a parked car with a force of 14,000 N?