

Answer on Question #42639, Physics, Mechanics | Kinematics | Dynamics

Question:

A stone of mass 0.49 kg is accelerated upward at a rate of 1.5 m/s. What force is applied to make this happen?

Answer:

Newton's second law of motion:

The acceleration of a body is directly proportional to, and in the same direction as, the net force acting on the body, and inversely proportional to its mass:

$$F_{net} = ma$$

Net force acting on the body equals:

$$F_{net} = F - mg$$

where mg is gravitational force.

Therefore:

$$F - mg = ma$$

$$F = m(a + g) = 0.49(1.5 + 9.8)kg \cdot \frac{m}{s^2} = 5.5 N$$

Answer: 5.5 N