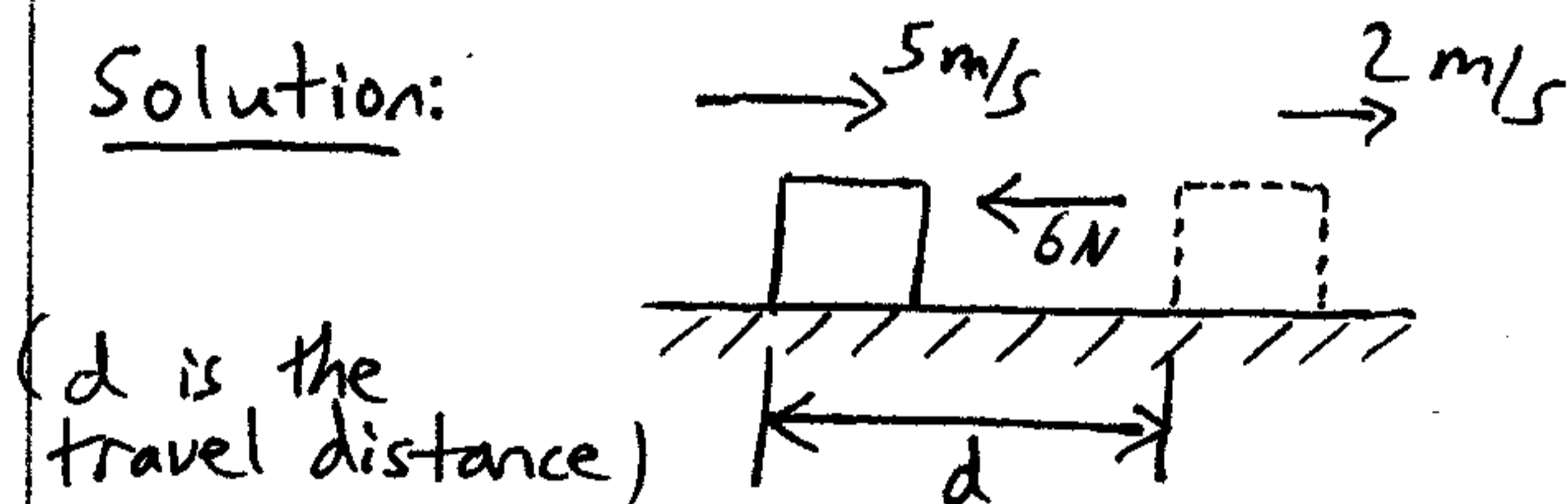


This is a force and motion problem involving Newton's laws.

A block of mass 2kg is sliding along a flat frictionless surface at a velocity of 5 m/s. A force of 6N is applied opposite the direction of motion of the block, and the block slows down to a velocity of 2 m/s.

What is the travel distance of the block over the time period that the force is applied?

Solution:



(d is the travel distance)

Apply Newton's 2nd law to the block:

$$F = ma$$

Substitute:

$$6N = (2\text{kg})a$$

$$a = 3\text{ m/s}^2 \leftarrow$$

This now becomes a 1-D kinematics problem with constant acceleration. Use this kinematics equation:

$$v_2^2 = v_1^2 + 2ad$$

substitute: $(2\text{ m/s})^2 = (5\text{ m/s})^2 + 2(-3\text{ m/s}^2)d$
 $d = 3.5\text{ m (ans.)}$