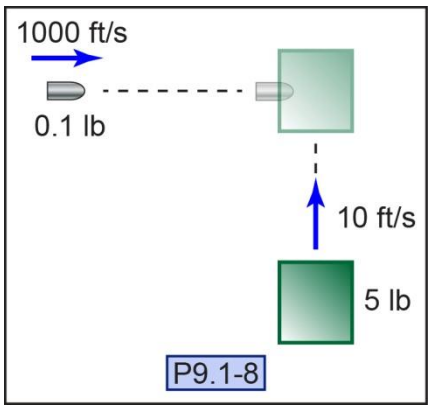
P9.1-8) A 0.1-lb bullet is travelling at 1000 ft/s when it strikes a 5-lb block travelling at 10 ft/s on a smooth surface in the directions shown. If the bullet hits the block centrally and is embedded in the block, determine the speed and direction of the bullet/block system following the collision.



Given:

Find:

Solution:

Setting up the problem

Label your states on the figure.

Does this system conserve momentum?

Yes No

Does this system conserve energy?

Yes No

Principle of linear impulse and momentum

Calculate the velocity of the block and bullet as they move as one.

a) v = 21.92 ft/s, $\theta = 63.4^o$ b) v = 21.92 ft/s, $\theta = 26.6^o$

c) v = 29.41 ft/s, $\theta = 26.6^o$ d) v = 29.41 ft/s, $\theta = 63.4^o$