

UNIVERSITY OF ALABAMA
Department of Physics and Astronomy

PH 105 LeClair

Summer 2012

Problem Set 8

Instructions:

1. Answer all questions below. All questions have equal weight.
2. Due Wed 13 June 2012 at the start of lecture.
3. You may collaborate, but everyone must turn in their own work.

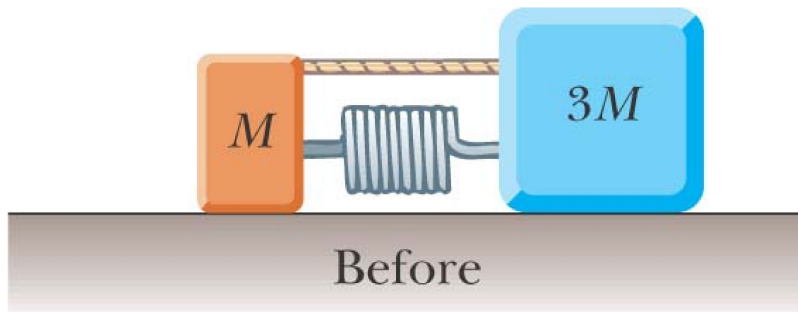
1. A 12.0 g wad of sticky clay is hurled horizontally at a 100 g wooden block initially at rest on a horizontal surface. The clay sticks to the block. After impact, the block slides 7.50 m before coming to rest. If the coefficient of friction between the block and the surface is 0.650, what was the speed of the clay immediately before impact?

2. Two blocks of masses M and $3M$ are placed on a horizontal, frictionless surface. A light spring is attached to one of them, and the blocks are pushed together with the spring between them (see below). A cord initially holding the blocks together is burned; after this, the block of mass $3M$ moves to the right and the block of mass M moves to the left.

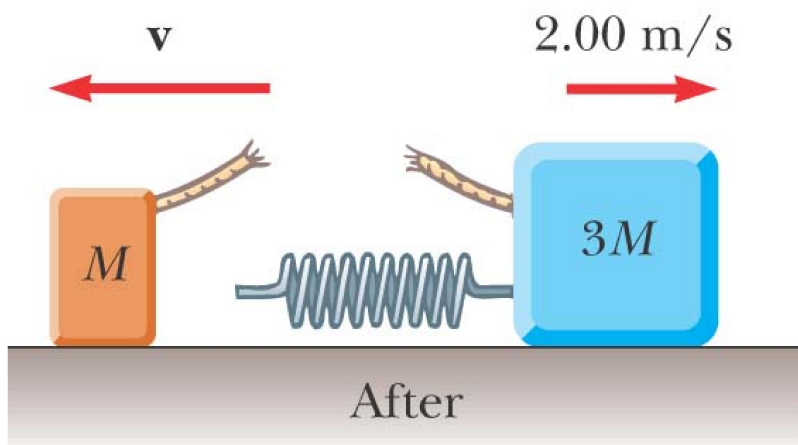
If the original elastic potential energy in the spring is 6 J, find the speed of the block of mass M .

3. A 1500 kg car is traveling at 15 m/s and hits a 2500 kg SUV head-on. The SUV was at rest before the collision, but left in neutral, and the car and SUV are stuck together after the collision (purely inelastic collision).

What is the final velocity of the car and SUV stuck together?



(a)



(b)