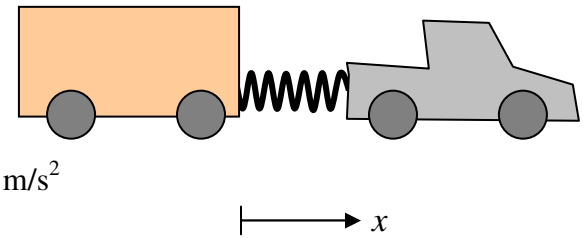
Spring Example Problem: FBD

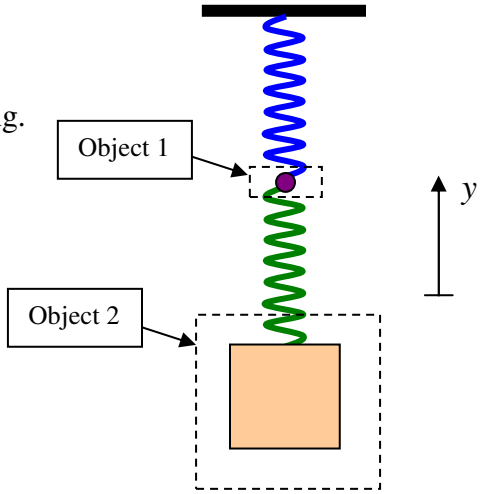
A car tows a trailer of mass M. The hitch is a spring. The car accelerates at rate a. How much is the spring stretched?

$M = 92$ kg $k = 2300$ N/m $a = 0.30$ m/s^2



Spring Example Problem: FBD

Two identical massless springs k hold up a block m from the ceiling. What is ΔL_{tot}?

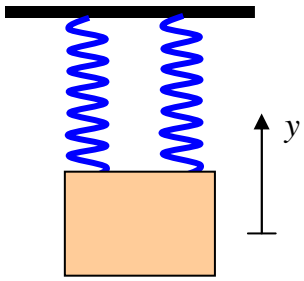


Object 1:

Object 2:

Spring Example Problem: FBD

Two identical springs k hold up a block m from the ceiling.
By how much ΔL do they stretch?

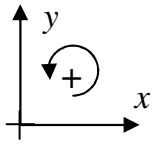


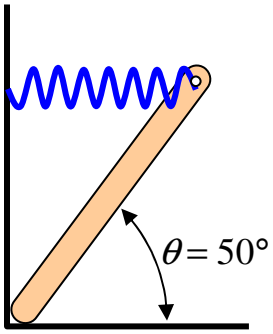
Object = the block

Spring Example Problem: FBD

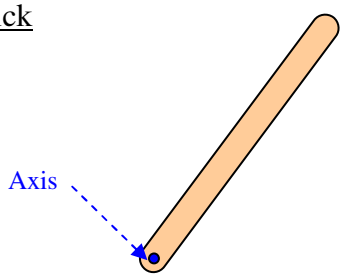
A thin stick rests in the corner between the floor and a wall.
At equilibrium, the spring is horizontal. What is ΔL?

m = 10 kg k = 175 N/m



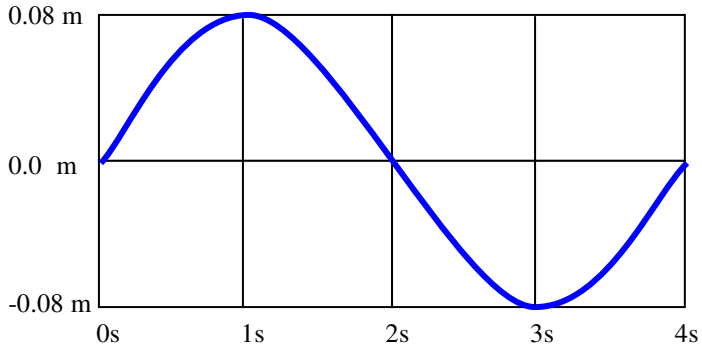


Object = stick



SHM Example Problem

The motion of an object of mass m =1.2 kg is shown.
Find amplitude x_{max}, ω, k, $v(t = 1)$, $v(t = 2)$, and $a(t=1)$.



SHM Example Problem

As a test, a machine vibrates parts on an oscillating table. NASA wants to test a part so that it experiences acceleration of $\pm 25g$. If the part is vibrated with a frequency $f = 9.5$ Hz, what is the necessary amplitude of the oscillation?