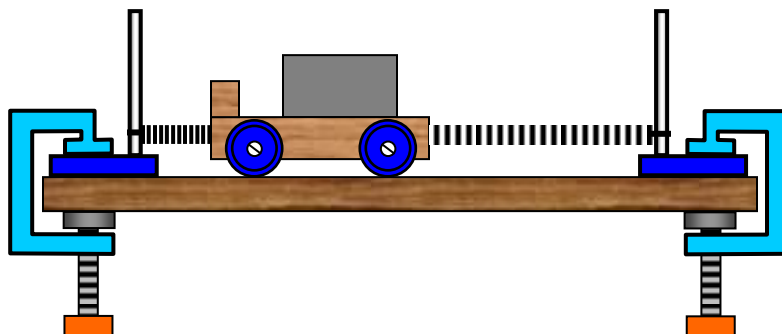# Simple harmonic motion 2

1. Does a body undergoing s.h.m always have to be moving in a straight line? Explain your answer.

2. Why is the springiness of a diving board adjusted for different dives and different divers? How is this adjustment made?

3. The period of a certain simple pendulum is 2.0 s and the mass of the pendulum bob is 50g. The bob is pulled aside through a horizontal distance of 8 cm and then released. Find the displacement and kinetic energy of the bob 0.7 s after its release.

4. A spiral spring extends 0.2 m when a load is placed on it. The mass is then pulled down a short distance and released. Calculate
    (a) the period of the motion, and
    (b) the period of the motion if the same mass was used but the spring was cut in half and only half of it used.

5. The following question concerns the trolley shown in the following diagram..

A trolley of mass 3.0 kg oscillates with simple harmonic motion on a frictionless horizontal surface due to the forces in the two springs. The displacement after a time t is given by the equation:

  $x = 0.6 \cos 0.5\pi t$

Calculate:
    (a) the amplitude of the motion,
    (b) the period of oscillation of the trolley,
    (c) the displacement after 4 s,
    (d) the velocity when t = 0.1 s, and
    (e) the maximum kinetic energy of the trolley.
    The trolley's motion is described by the equation given only if the trolley had a maximum displacement to the right when t = 0