

So far we have treated springs as though they had no inertia, and acted purely as reservoirs of elastic potential energy. This, of course, is at best an approximation, and in some circumstances the inertia of the spring itself may play a dominant role. By way of approaching this question, let us consider the problem, beloved by textbook writers, of a body of mass  $m$  attached to a uniform spring of total mass  $M$  and spring constant  $k$ .<sup>1</sup> How does the period of oscillation differ from what it would be if the spring were massless? Even without doing any calculations we can predict that the period will be lengthened. But by how much?