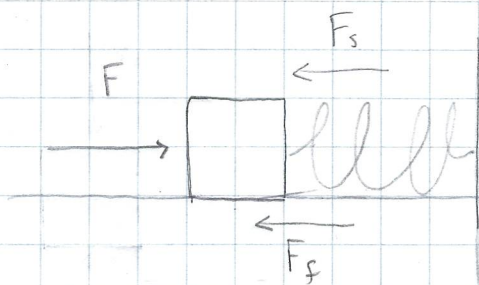


20-P-WE-AF-004

Work of Force: Intermediate

Q: A block of a mass of 'M' kg rests on a spring of $k = 'K'$ N/m as shown in the diagram. What is the work done by gravity, spring and total work? Assume $\mu = \mu$ and block is in motion and already displaced by 0.5.

A:



$$\sum F_x = m a_x = 0$$

$$= F - F_s - F_f = 0$$

$$F_f = \mu N = Mg\mu$$

$$F_s = Ks = K(d + 0.5)$$

$$\frac{F - Mg\mu}{K} - 0.5 = d$$

$$s_1 = 0.5$$

$$s_2 = d + 0.5$$

$$U_{1-2} = - \left(\frac{1}{2} K s_2^2 - \frac{1}{2} K s_1^2 \right) - \mu K N (s_2 - s_1) = W_{SF}$$

$$U_{1-2} = F(s_2 - s_1) = W_F = F(d)$$

$$W_T = W_F - W_s$$