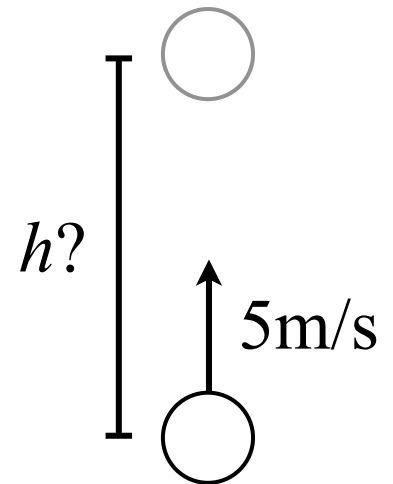


1. Throw a 2kg ball with speed 5m/s into the air. How high does it go?

**Initial Energy**

KE

PE



**Final Energy**

KE

PE

**Solve**  $E_f = E_i + W$

2a. The natural length of this spring is 5cm and it has a stiffness of 800N/m. When the spring is released, it pushes the block across the floor. How fast is the block moving as soon as it loses contact with the spring?



**Initial Energy**

KE

PE

**Final Energy**

KE

PE

**Work  $W$**

**Solve**  $E_f = E_i + W$

2b. Same setup as before. If the coefficient of kinetic friction between block and table is  $\mu_K=0.2$ , how far will the block go before stopping?



**Initial Energy**

KE

PE

**Final Energy**

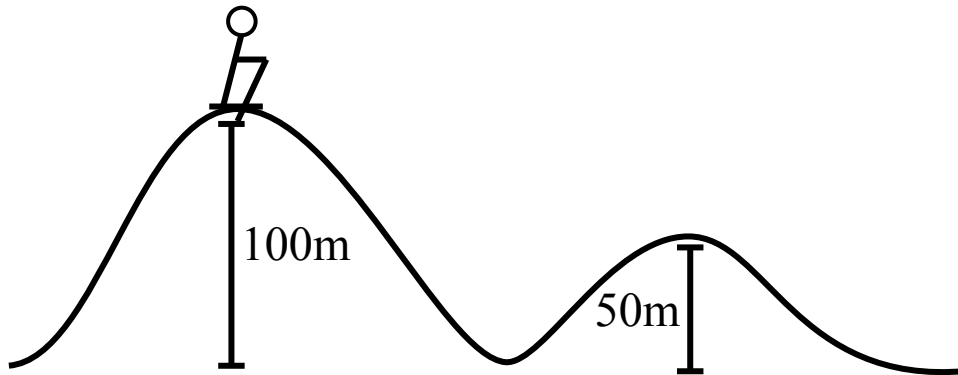
KE

PE

**Work  $W$**

**Solve  $E_f = E_i + W$**

3. A 50kg skier starts from rest at the top of a hill. How fast is she moving at the top of the second hill? (Assume no friction.)



**Initial Energy**

KE

PE

**Final Energy**

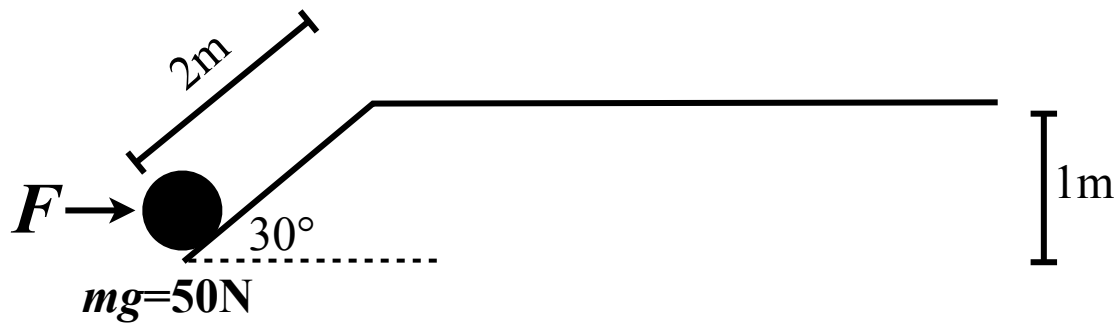
KE

PE

**Work  $W$**

**Solve**  $E_f = E_i + W$

4. What is the minimum force required to push this bowling ball (weight  $mg=50\text{N}$ ) 2 meters to the top of the ramp?



### Initial Energy

KE

PE

### Final Energy

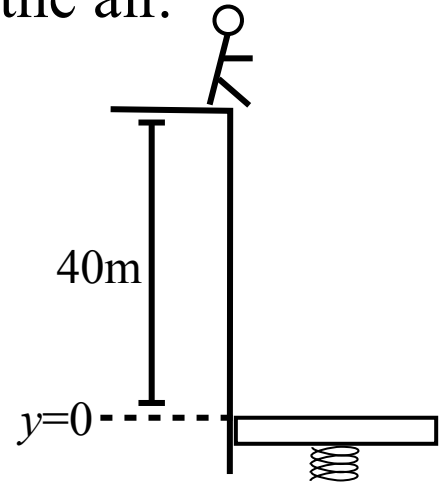
KE

PE

### Work $W$

Solve  $E_f = E_i + W$

5. An 80kg man falls 40m and lands on a spring with stiffness  $k=4000$  N/m. The spring compresses by  $\Delta y$  before bouncing him back into the air. Find  $\Delta y$ .



**Initial Energy**

KE

$PE_G$

**Solve**  $E_f = E_i$

$PE_S$

**Final Energy**

KE

$PE_G$

$PE_S$