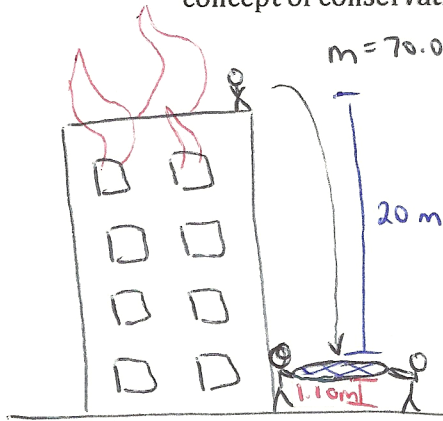


**Example 5:**

A 70.0 kg person begins from rest and jumps into a fire net 20.0 m below. The net behaves like a spring and stretches 1.10 m on impact again, bringing the person to rest. Use the concept of conservation of energy to find the *spring constant* of the net



$m = 70.0 \text{ kg}$  ① Energy at location #1

KE	GPE	Elastic PE
No (starts from rest)	$mgh$	No (net not stretched)

$$E_1 = 0 + mg(20 + 1.10) + 0$$

② Energy at location #2

KE	GPE
No (back at rest)	No, set $h = 0 \text{ m}$ here

Elastic PE  
yes

$$E_2 = 0 + 0 + \frac{1}{2} k x^2$$

$$E_1 = E_2$$

$$mg(20 + 1.10) = \frac{1}{2} k x^2$$

$$(70)(9.8)(20 + 1.10) = \frac{1}{2} k (1.10)^2$$

$$14,474.6 = \frac{1}{2} k (1.10)^2$$

$$k = 23,925 \text{ N/m}$$