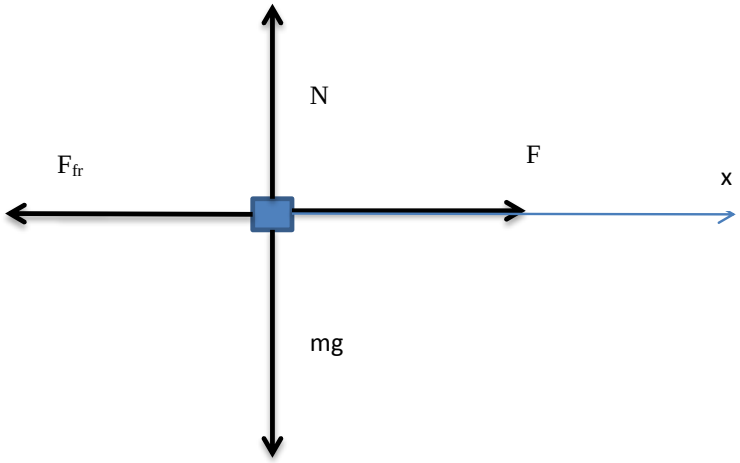
A team of dogs drags a 121 kg sled 1.72 km over a horizontal surface at a constant speed. The coefficient of friction between the sled and the snow is 0.205. The acceleration of gravity is 9.8 m/s. Find the work done by the dogs. Answer in units of kJ.



F_{fr} – friction force

F – pulling force

Constant speed => acceleration equals 0.

Newton's first law of motion:

$$x: \quad F = F_{fr}$$

$$y: \quad N = mg$$

Friction force equals $F_{fr} = \mu N = \mu mg$, μ - coefficient of friction.

Therefore:

$$F = \mu mg$$

The work done by a constant force of magnitude F on a body that moves a displacement d in the direction of the force is the product:

$$W = Fd = \mu mgd = 0.205 * 121\ kg * 9.81 \frac{m}{s^2} * 1720\ m = 419\ kJ$$

Answer: $419\ kJ$