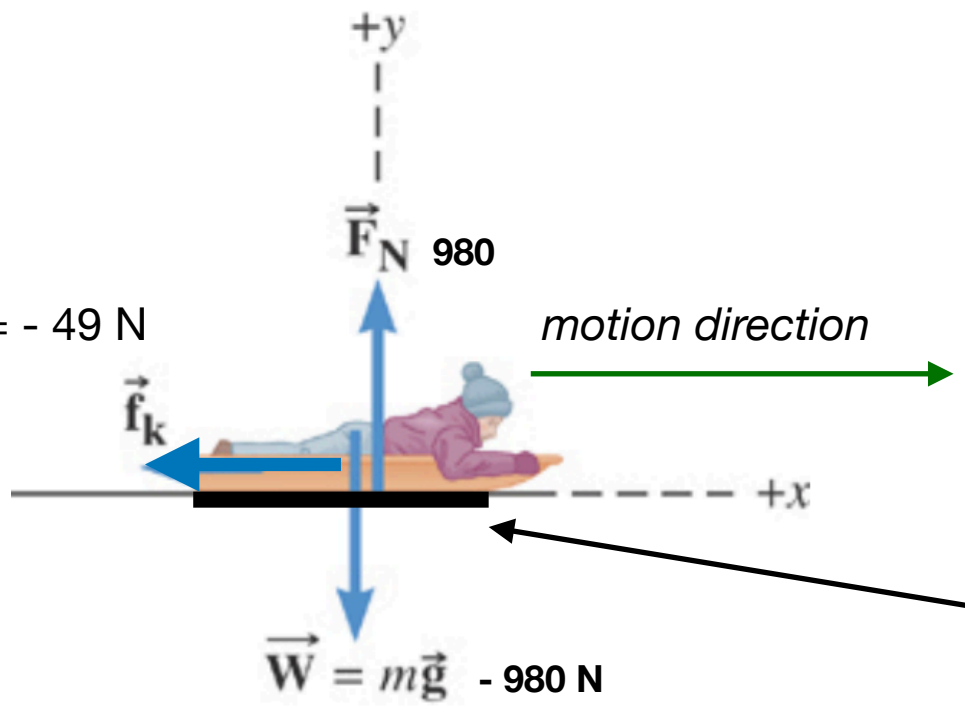
Assume that the mass of the girl with the sled is 100 kg.



$f_k = \mu_k$ x m x g = - 49 N

motion direction

g = - 9.8 m/s²

Surface of contact:
Materials are Steel on Ice

μ_k = 0.05 (table)

(*b*) Free-body diagram for the sled and rider

Assume that the mass of the girl with the sled is 100 kg.

W = m x g = 100 x (- 9.8) = - 980 N

The normal force (FN) = -W = 980 N

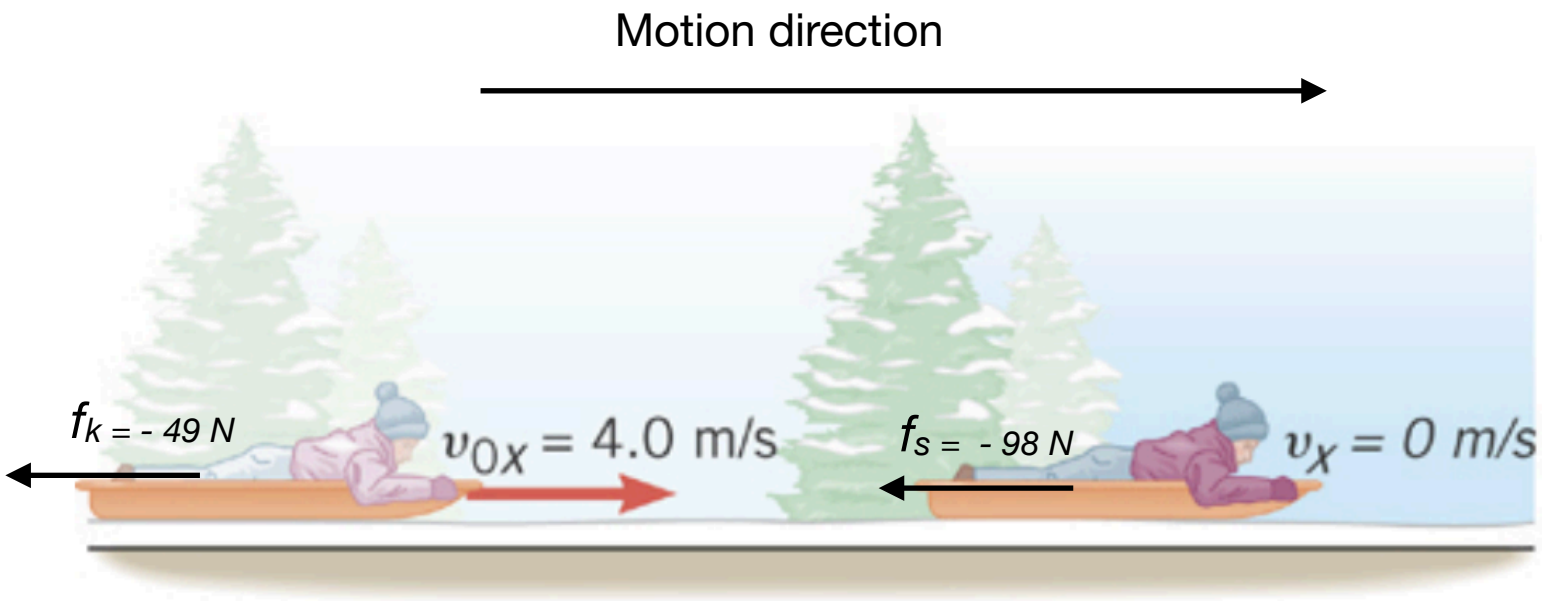
Kinetic Frictional Force
$f_k = \mu_k F_N = \mu_k mg$

μ_k is the coefficient of kinetic friction: Steel on ice = 0.05

f_k = μ_k x m x g = 0.05 x 100 x 9.8 = 49 N = -49 Newtons

Direction of the frictional force

1- Opposite to motion
2- Parallel to the surface of contact.



Moving (**Kinetic**)
1) Kinetic frictional force
2) Opposite to motion
3) Parallel to touch
4) $f_k = \mu_k \times m \times g$
$= 0.05 \times 100 \times 9.8$
$= -49$ N

Not moving (**Static**)
1) Static frictional force
2) Opposite to motion
3) Parallel to touch
4) $f_s = \mu_s \times m \times g$
$= 0.1 \times 100 \times 9.8$
$= -98$ N

To start moving the girl has to push to the front with a force
$F > 98N$

To keep moving, the girl has to push with a force that is more than 49 N.