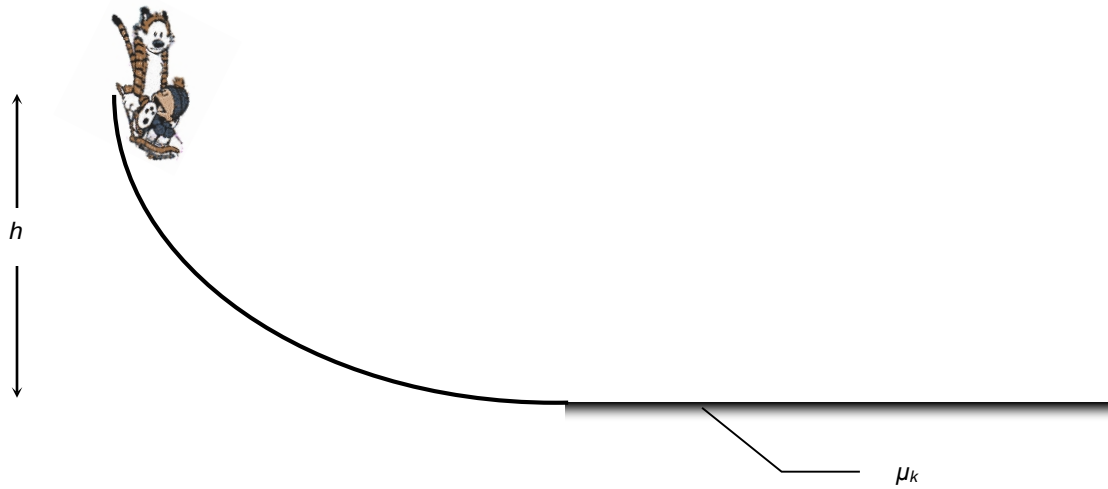## Example

Calvin and Hobbes are sledding down a smooth slide onto a rough surface with a coefficient of kinetic friction μ_k. Calvin, Hobbes and their sled have a combined mass of m_A and start at rest from the top of the slide.
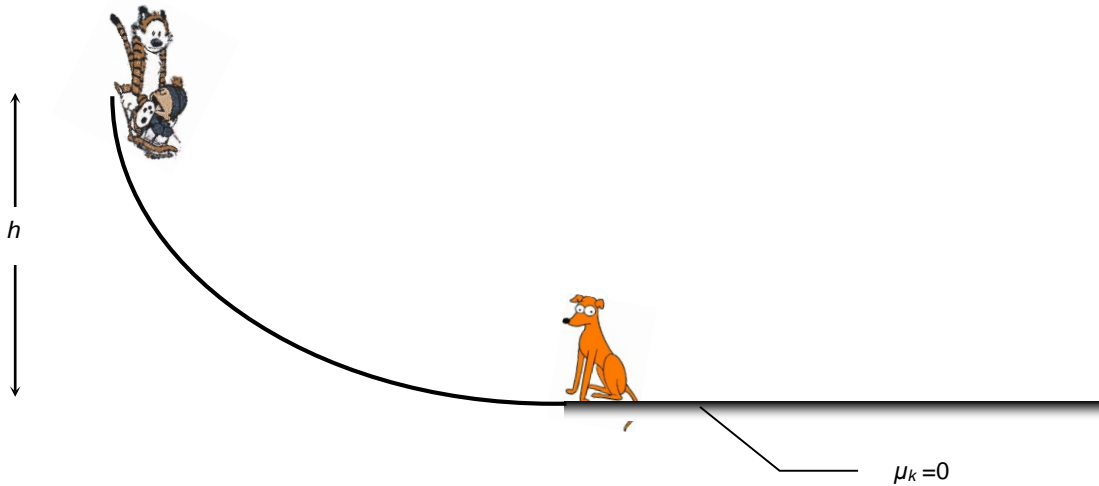
(a) Find the sled velocity as it comes onto the rough surface.
(b) Find distance that the sled travels before coming to a stop. (ANS: $x_{stop} = h/\mu_K$)

Example

Reconsider the sled in the last problem. This time, make the flat surface frictionless, but place Santa's Little Helper in the sled path. Santa's Little Helper has mass m_B.
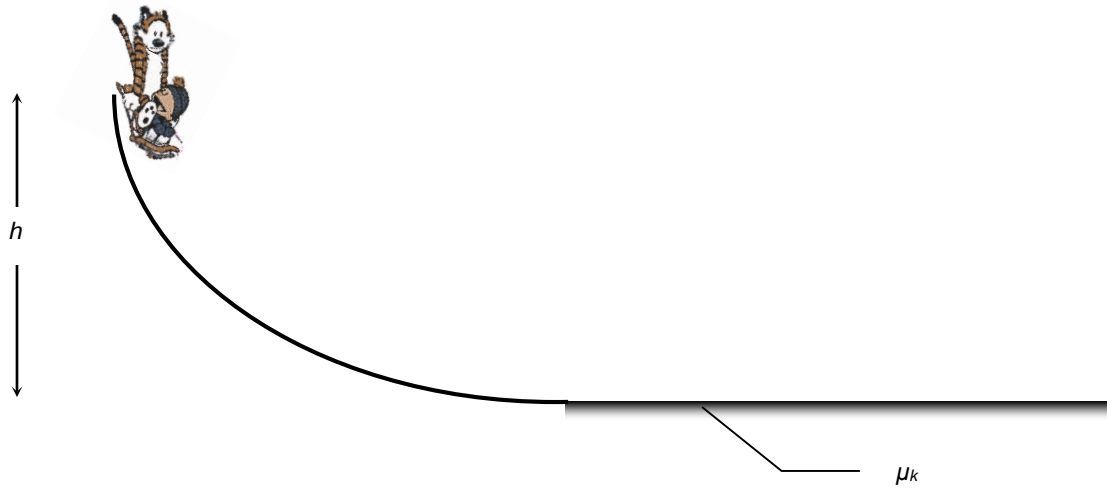
Find the velocity of Calvin, Hobbes, Santa's Little Helper and the sled after impact using the **conservation of energy**. Be sure to start with the most general form of conservation of energy.

$\mu_k = 0$

Example

Calvin and Hobbes are sledding down a smooth slide onto a rough surface with a coefficient of kinetic friction μ_k. Calvin, Hobbes and their sled have a combined mass of m_A and start at rest from the top of the slide.

(a) Find the sled velocity as it comes onto the rough surface.
(b) Find distance that the sled travels before coming to a stop. (ANS: $x_{stop} = h/\mu_K$)

Example

Reconsider the sled in the last problem. This time, make the flat surface frictionless, but place Santa's Little Helper in the sled path. Santa's Little Helper has mass m_B.

Find the velocity of Calvin, Hobbes, Santa's Little Helper and the sled after impact using the **conservation of linear momentum**.

h

$\mu_k = 0$
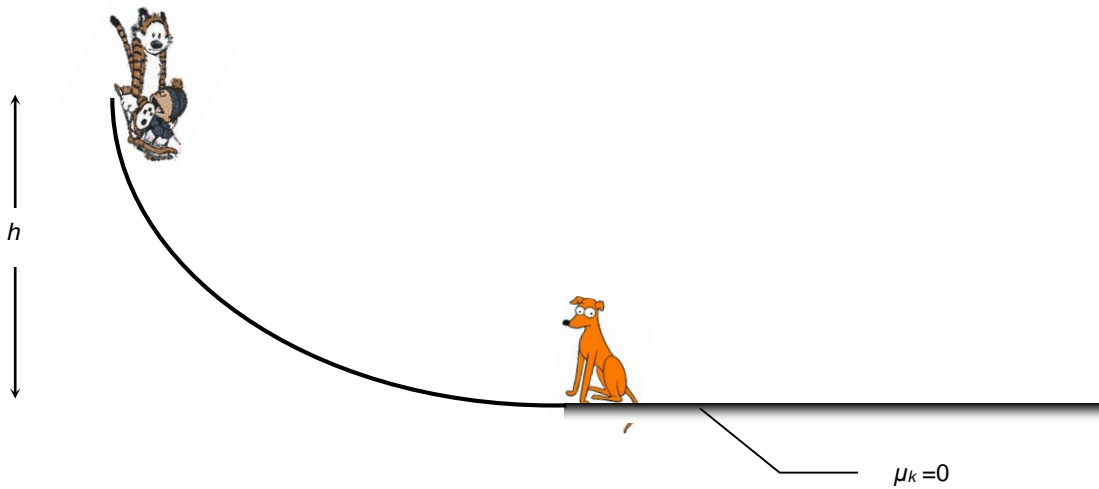
Example

Dr. Thom drops a 75 lb dumbbell from a height of 5 ft onto a springboard. The spring board has a mass of 10 lbm with springs of stiffness 450 lb/in. The springs are initially compressed 0.022 in. Calculate the maximum deflection of the springboard in inches.