

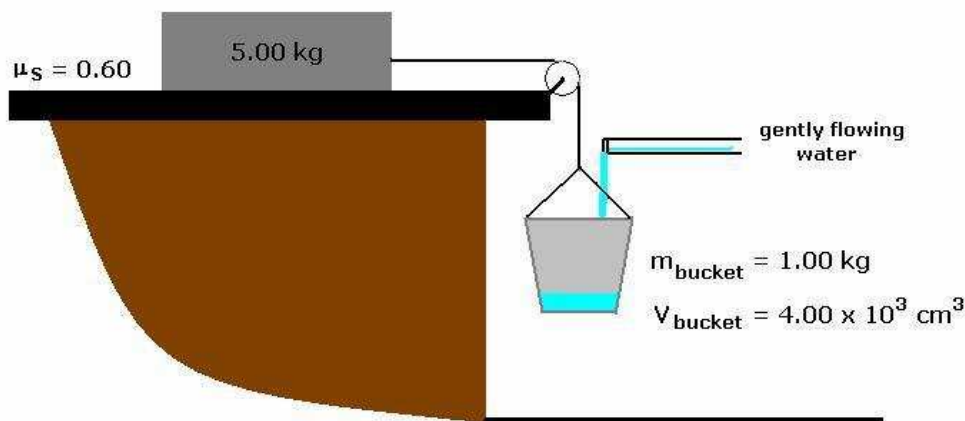
The Force of Static Friction I

Achieving the Force Required to Initiate Translational Motion

A 5.00-kg block is at rest on a horizontal surface between which there is a coefficient of static friction of 0.60 as shown in the diagram below. A massless string is draped over a frictionless pulley fixed to the edge of the horizontal surface. One end of the string is attached to the block. Suspended from the other end of the string is a 1.00-kg empty bucket into which water will gently flow from a horizontal pipe. The bucket possesses a volume of $4.00 \times 10^3 \text{ cm}^3$.

How much water must be added in order to initiate sliding?

Will the bucket be able to hold sufficient water to allow sliding?



Based upon your understanding of systems of concurrent forces, answer the following questions. [You must show all work in support of your answers.]

1. How much water must flow into the bucket in order to initiate sliding of the block?
2. Will the bucket be able to hold this quantity of water?