

## Determining Coefficients of Friction Worksheet

- Based on the coefficient of friction table handed out to you in class, which type of road, asphalt or concrete, provides better traction (friction of a tire on a road) for rubber tires under
  - dry conditions?
  - wet conditions?
- Use the data from the table to verify that driving on an icy highway is much more dangerous than on a wet one.
- Determine the appropriate coefficient of friction in each case.
  - It takes 59 N of horizontal force to get a 22-kg leather suitcase just starting to move across a floor.
  - A horizontal force of 54 N keeps the suitcase in (a) moving at a constant velocity.
- A 73-kg hockey player glides across the ice on skates with steel blades. What is the force of friction acting on the skater?
- A 1.50-Mg car moving along a concrete road has its brakes locked and skids to a smooth stop. Calculate the force of friction (a) on a dry road and (b) on a wet road.
- A worker of a moving company places a 252-kg trunk on a piece of carpeting and slides it across the floor at constant velocity by exerting a horizontal force of 425 N on the trunk.
  - What is the coefficient of kinetic friction?
  - What happens to the coefficient of kinetic friction if another 56-kg trunk is placed on top of the 252-kg trunk?
  - What horizontal force must the mover apply to move the combination of the two trunks at constant velocity?
- Assume you are on a luge toboggan that has a regulation mass of 22 kg and no brakes. The luge relies partly on friction to slow it down. If the coefficient of kinetic friction between the luge and the horizontal icy surface is 0.012, what is the kinetic friction acting on the luge?
- A 12-kg toboggan is pulled along at a constant velocity on a horizontal surface by a horizontal force of 11 N.
  - What is the force of gravity on the toboggan?
  - What is the coefficient of friction?
  - How much horizontal force is needed to pull the toboggan at a constant velocity if two 57-kg girls are sitting in it?
- A smooth wooden block is placed on a smooth wooden tabletop. You find that you must exert a force of 14.0 N to keep the 40.0 N block moving at a constant velocity.
  - What is the coefficient of sliding friction for the block and table?
  - If a 20.0 N brick is placed on the block, what force will be required to keep the block and brick moving at constant velocity?
- A 52-N sled is pulled across a cement sidewalk at constant speed. A horizontal force of 36 N is exerted. What is the coefficient of sliding friction between the sidewalk and the metal runners of the sled?
  - Suppose the sled now runs on packed snow. The coefficient of friction is now only 0.12. If a person weighing 650 N sits on the sled, what force is needed to slide the sled across the snow at constant speed?