Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Physics 11

**Worksheet 5.3**

**Friction**

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| 1) A 7.6 kg crate is resting on a horizontal surface (µstatic=0.25, µkinetic=0.15). What is the force of friction if you push with 10N? 15N? 30N? Draw an FBD for each case.        2) A 7.6 kg sled is sitting on a horizontal surface. If the coefficient of static friction is 0.2, how hard do you have to pull to get the sled moving?          3) A 9.6 kg piece of roadkill is dragged along the road. If the coefficient of friction is 0.11, what is the force of friction? | 4) A 20 N object is pulled along a horizontal surface at a constant velocity by 3 N of force. What is the coefficient of friction?  5) A 16.2 kg object is pulled along a frictionless surface by an applied force of 10.2 N, what is the normal force acting on it? Draw an FBD.  6) A 6.2 kg sleigh is pulled along a horizontal surface by a force of 22 N. If its acceleration is 1.1 m/s2, what is the coefficient of friction between the sleigh and the surface? Draw an FBD. |

7) A 1250 kg super-toboggan traveling at 60 km/h reaches a flat patch of dirt and quickly stops over a distance of 35 m. What is the coefficient of friction between the super-toboggan and the dirt?

8) A 950 kg rocket car cruising down the road suddenly loses all four of its wheels. To prevent it from slowing down as it grinds against the pavement, the pilot increases the rocket thrust and the wheel-less car continues at a constant velocity of 28 m/s. If the coefficient of friction between the car and the road is 0.125, how much force is the rocket providing? Draw an FBD.  
  
  
  
  
  
  
  
  
  
9) Santa’s Reindeer exert a force of 13900 N on his 1425 kg sleigh, accelerating it from 0 to 100 km/h in 3.25 s. What is the coefficient of friction between the sleigh and the rooftop? Draw an FBD.

Answers: 1) 10 N; 15 N; 11.2 N 2) >14.896 N 3) 10.35 N 4) 0.15 5) 158.76 N 6) 0.25  
7) 0.405 8) 1164 N 9) 0.123