

Name _____ Date _____
Teacher _____ Period _____

Friction Worksheet

Typical Coefficients of Friction		
Surface	μ_s	μ_k
Rubber on concrete	0.80	0.65
Rubber on wet concrete	0.60	0.40
Wood on wood	0.50	0.20
Steel on steel (dry)	0.78	0.58
Steel on steel (with oil)	0.15	0.06
Teflon on steel	0.04	0.04

1. A 57 N force is required to keep a 25 kg crate moving at a constant velocity. What is the coefficient of kinetic friction between the crate and the floor?
2. The director of a museum moves displays from one place to another across different surfaces. Use the table above to find the maximum static friction force and the kinetic friction force in each of the following situations:
 - a. moving a 150 kg steel sculpture across a dry steel platform
 - b. pushing a 220 kg wood bed across a wood floor
 - c. sliding a 15 kg sword on a stand with Teflon pads across a steel display
 - d. pulling a 137 kg cart with locked rubber wheels across a dry concrete floor

3. A 35 kg chair initially at rest on a horizontal floor requires a 390 N force applied horizontally to start it moving. Once the chair is in motion, a 330 N force keeps it moving at a constant velocity.
- What is the coefficient of static friction between the chair and the floor?

 - What is the coefficient of kinetic friction between the chair and the floor?
4. A force of 20.0 N accelerates a 9.0 kg wagon at 2.0 m/s^2 along the sidewalk.
- What is the net force on the mass?

 - What is the size of the frictional force on the wagon?

 - What is the coefficient of kinetic friction?
5. A force of 300.0 N is required to pull a 100.0 kg crate along the ground at a **constant velocity**.
- What is the force of friction that is opposing the motion of the crate?

 - What is the coefficient of friction between the crate and the ground?

 - What force must you apply to the crate to accelerate it at a constant 2.0 m/s^2 ?