Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hr \_\_\_\_\_\_\_

**Friction-Notes**

* *\_\_\_\_\_\_\_\_\_\_\_\_* is a force that resists the motion of objects or surfaces.
* Many kinds of friction exist.





Friction depends on \_\_\_\_\_\_\_of the \_\_\_\_\_\_\_\_ in contact.

When the hockey puck slides on ice, a thin layer of water between the rubber and the ice allows the puck to slide easily.



**Identifying friction forces**

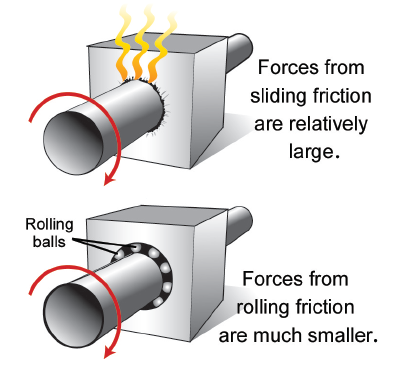
* Friction is a \_\_\_\_\_\_\_\_, measured in \_\_\_\_\_\_\_\_\_ just like any other force.
* *\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_* keeps an object at \_\_\_\_\_\_from moving.
* *\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_* is a force that resists the motion of an object \_\_\_\_\_\_\_\_\_\_ across a surface.

\_\_\_\_\_\_\_\_\_\_ depends on a material’s properties such as roughness, how clean the surfaces are, and other factors.

The greater the \_\_\_\_\_\_\_\_squeezing two surfaces together, the greater the \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_.

**Reducing the force of friction**

* Unless a \_\_\_\_\_\_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_\_ applied, friction will slow all motion to a \_\_\_\_\_ eventually.
* It is impossible to completely get rid of \_\_\_\_\_\_\_\_\_\_\_, but it can be reduced.
* The \_\_\_\_\_\_\_\_\_ between a shaft (the long pole in the picture) and an outer part of a machine produces a lot of \_\_\_\_\_\_\_\_.
* Friction can be \_\_\_\_\_\_\_\_\_ by placing ball bearings between the shaft and the outer part.



**Using Friction**

\_\_\_\_\_\_\_\_\_\_\_ is also important to anyone driving a car.

Grooved tire treads allow space for water to be channeled away from the road-tire contact point, allowing for \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ in wet conditions.

Shoes are designed to increase the \_\_\_\_\_\_\_\_\_\_ between their soles and the ground.

**Friction and energy**

\_\_\_\_\_\_\_\_\_\_\_ changes energy of motion into \_\_\_\_\_\_\_ energy.

\_\_\_\_\_\_\_\_\_\_ is always present in any machine with moving parts.

If the machine is small, or the forces are low, the amount of \_\_\_\_\_\_ produced by \_\_\_\_\_\_\_\_\_ may also be small.

**Practice:**

1. **In the picture below, explain why the bear fell. Use FRICTION to explain your answer.**

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1. **How does surface roughness affect friction?**
2. **Discuss the relationship between the size and weight of an object and the amount of friction that is present**
3. **Sports such as soccer involve running, stopping, jumping, and kicking. Discuss how friction helps players.**
4. **Brianna is rowing a small boat across a pond. The air is calm; there is no wind blowing.** 
   1. **What type of fiction is resisting her motion?**
   2. **If two friends join her in the boat, will the friction force change? Why or why not?**