

Name: _____

Rubbed the Wrong Way (Teacher Version)

Types of Friction

There are 3 basic types of friction in our everyday lives: **Dry**, **Fluid**, and **Rolling Friction**. Label the following images based on the type of friction shown:



a) Dry

b) Fluid

c) Rolling

d) Rolling

e) Sliding

f) Fluid

Did You Know?

Besides affecting motion, did you know that friction can also charge objects? Friction is a very common cause of **static electricity**, which occurs when either positive or negative charges collect on an object's surface. Different materials attract electrons more than others, so by rubbing certain materials together one object builds up a negative charge while the other builds up a positive charge. Do you think that the balloon in the picture has a positive or negative charge? How about the girl's hair? *Balloon is negative, hair is positive.*



Static & Moving Friction

Materials:

- Several Rubber Bands
- Pencil
- Shoe Box
- Objects to pull



Instructions:

1. Loop all of the elastics together so you have something about as long as your arm.
2. Punch a hole in the shoebox and thread the elastic through the hole, securing it with a pencil.
3. Decorate your box! When you're done, place some weighted objects in the box and find a smooth floor.
4. Hold the end of your elastic chain and stretch it out until the box begins to move.

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Talk About It!

1. When were the elastics stretched out the longest?

The elastics were stretched out the longest when trying to get the box starting.

2. What does this mean in terms of the amount of force needed to get something going versus keeping it going?

This means that getting an object moving takes more force than maintaining an object's movement.

Da Vinci's Corner

Leonardo da Vinci (1452-1519) was the first person to discover and document the rules of sliding (kinetic) friction. Aside from this work in physics, he was a painter, sculptor, architect, mathematician, inventor, anatomist, engineer, musician, botanist, and writer. That's quite a list! He was reported as a man who had an "unquenchable curiosity".



Friction Factors

There are three main factors that will influence the total amount of friction:

- 1. The roughness of the surfaces**
- 2. The weight of the object**
- 3. The surface area**

Do these factors increase or decrease friction? *Increasing these factors increases friction.*

Write down one example of how each of these factors affect friction: *The rougher the ice, the easier to run; the heavier the block, the harder to move; the flatter the clay, the harder to slide.*



True or False?

1. T Although wheels are useful for rolling and reducing friction, they couldn't work without friction.

2. F It would be easier to stand without friction.

3. T Friction is able to generate static electricity.

4. T The harder two objects are pressed together, the more force it takes to overcome the friction and get them to slide.

5. T Fluid friction is used a lot in water parks to help people slide smoothly and safely down slides.



Name:

Image Sources:

Types of Friction:

1. Christmas Gifts: <http://www.christmasgifts.com/new-2012-clipart>
2. Superstock: <http://www.superstock.com/stock-photos-images/1829-14147>
3. Pixels: <http://pixels.com/featured/kayaker-riding-the-flow-of-the-shannon-river-limerick-ireland-pierre-leclerc.html>
4. CK12: [http://www.ck12.org/na/Friction----\(FORCES-CONCEPT-MAP\)-/lesson/user%3AdHZhbmRlbnJlcmdoQGNvbWl0eXNjaG9vbC5vcmc./Friction---%2528FORCES-CONCEPT-MAP%2529/](http://www.ck12.org/na/Friction----(FORCES-CONCEPT-MAP)-/lesson/user%3AdHZhbmRlbnJlcmdoQGNvbWl0eXNjaG9vbC5vcmc./Friction---%2528FORCES-CONCEPT-MAP%2529/)
5. Domain EQ: <http://www.domaineq.com/roller-skates-reviews-and-tricks/>
6. MTL Commerce: <http://www.mtlcommerce.com/shopping/ball-bearings/>

Did You Know?

1. Buzzle: <http://www.buzzle.com/articles/static-electricity/>

Static and Moving Friction:

1. Public Domain Pictures: <http://www.publicdomainpictures.net/view-image.php?image=1866>
2. The Pencil Project: <http://www.pencils4ghana.org>
3. Indiamart: <http://dir.indiamart.com/impcat/shoe-boxes.html>
4. Valleyvet: <http://www.valleyvet.com/library/worming-schedule-dogs-cats.html>

Da Vinci's Corner:

1. Biography: <http://www.biography.com/people/leonardo-da-vinci-40396#awesm=~oFvScadGltRVZ2>

Friction Factors:

1. Ravens: <http://kestrels.stfrancisoxford.net/2013/02/26/what-would-life-be-like-without-friction/>

True or False?

1. Melrose Wheelchairs: http://www.melrosewheelchairs.com/index.php?main_page=index&cPath=8_2
2. 4Vector: <http://4vector.com/free-vector/free-vector-clip-art-man-standing-cartoon-clip-art-106320>
3. E of Dreams: <http://eofdreams.com/electricity.html>
4. Turbosquid: <http://www.turbosquid.com/3d-models/3d-model-c-clamp/336495>
5. Pam Moore: <http://www.pammarketingnut.com/2013/08/12-tips-to-a-create-a-user-focused-conversion-funnel-your-audience-will-zoom-through/>