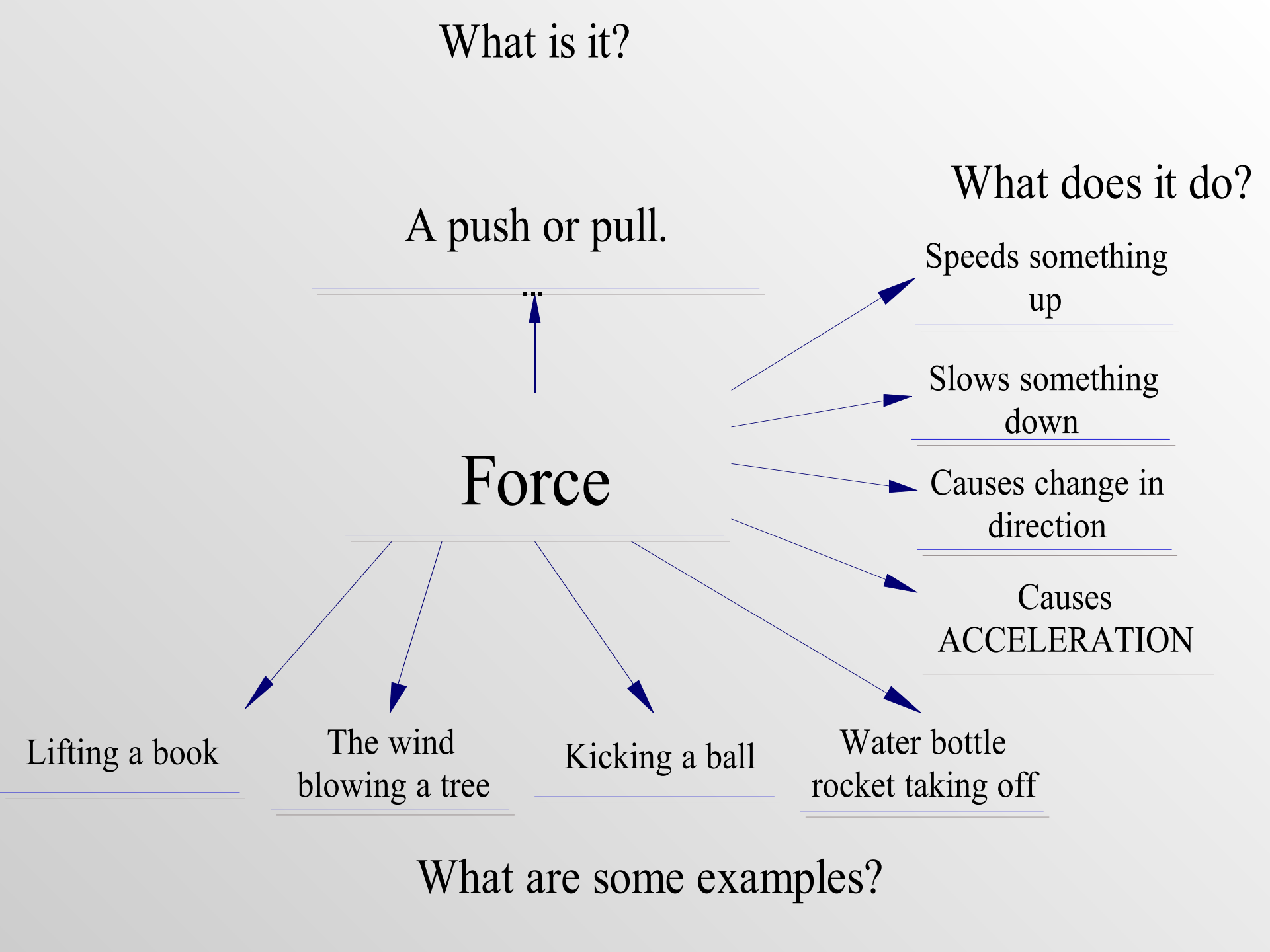
Force v. Friction

Essential Question

What is the effect of a force on the motion of an object?


What is it?
A push or pull.
What does it do?
Speeds something up
Slows something down
Causes change in direction
Causes ACCELERATION
Force
Lifting a book
The wind blowing a tree
Kicking a ball
Water bottle rocket taking off
What are some examples?

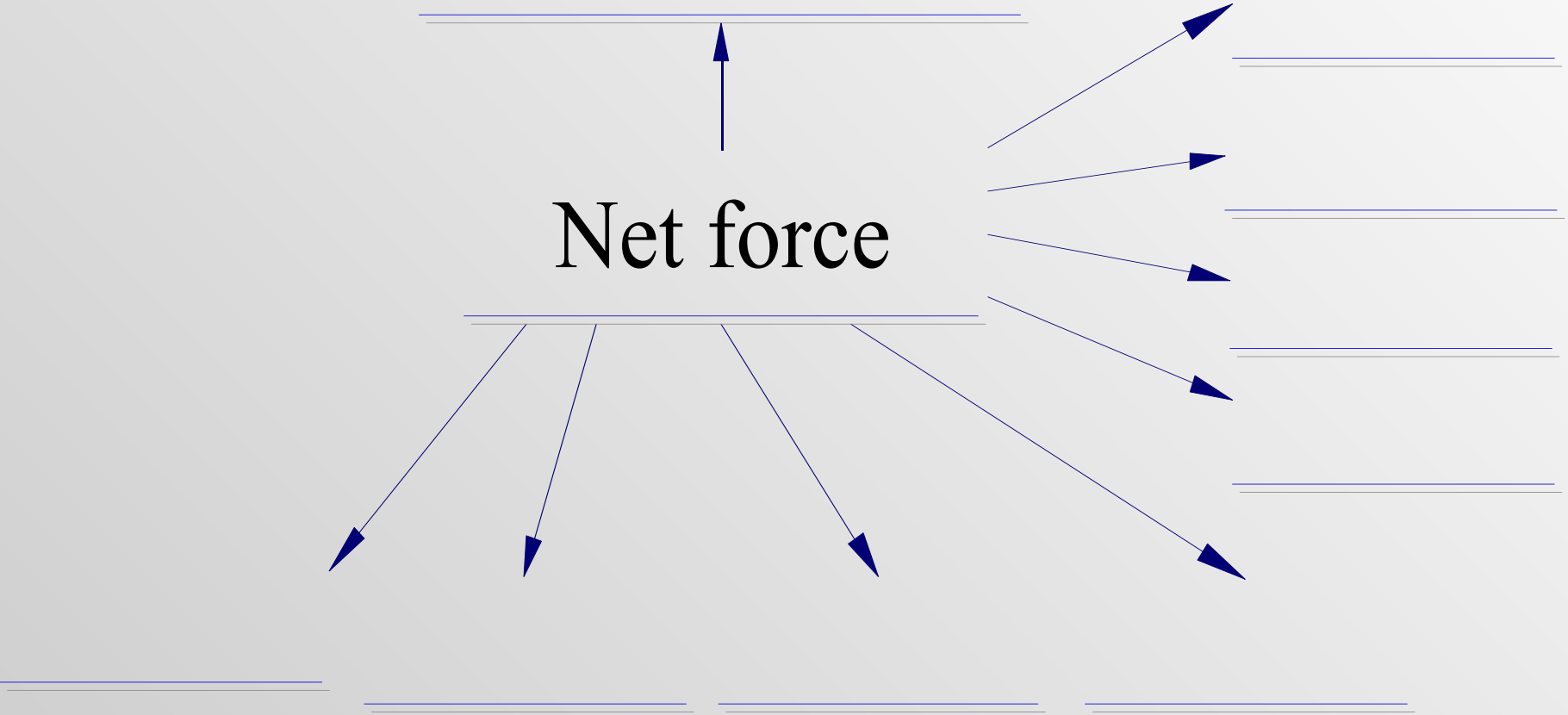
Combining Forces

- Forces, like velocity, act in a direction.
- Forces acting in the same direction are added together.
- Forces acting in opposite directions are subtracted.

What is it?

The combination of all forces acting on an object

What is it like?

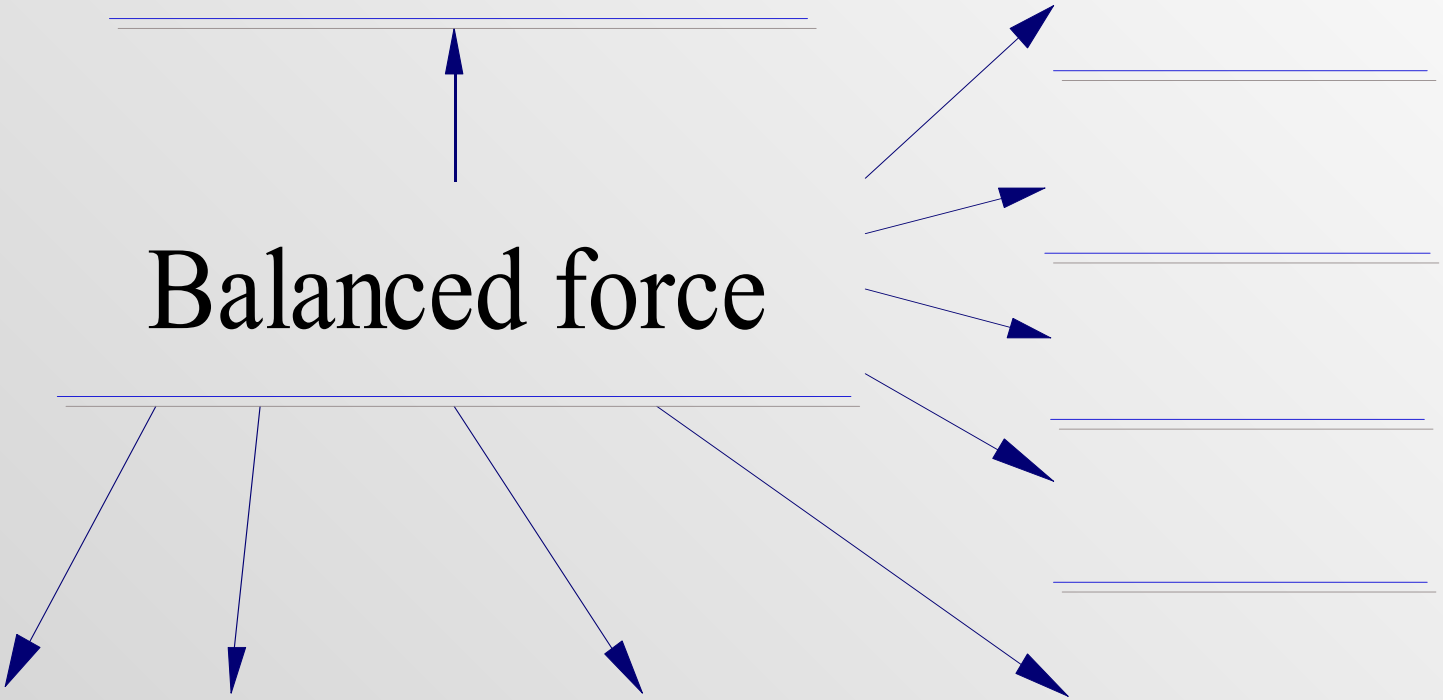


What are some examples?

What is it?

When two forces are equal in size but opposite in direction

What is it like?



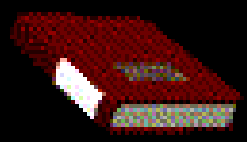
What are some examples?

With a partner

Draw a picture to illustrate either the concept of Balanced Forces or Net Force. Use arrows to indicate the size and direction of forces.

F_1 =
8 Newtons

F_2 =
6 Newtons



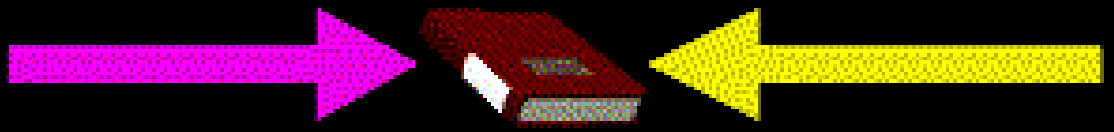
Net Force =
14 Newtons

F_2 =

18 Newtons

F_1 =

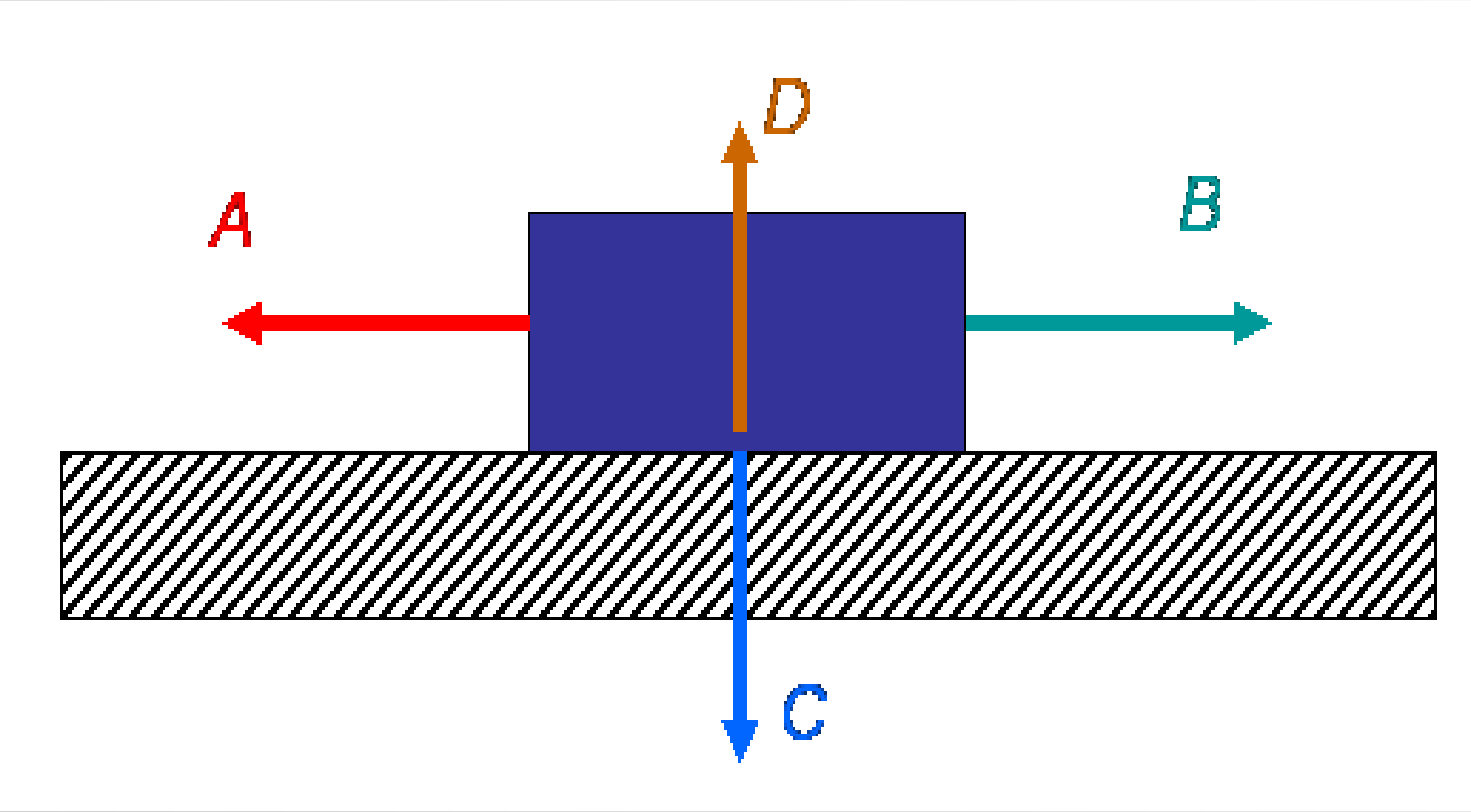
-20 Newtons



Net Force =

-2 Newtons

Balanced Forces



Calculating Force

F=ma

Force equal mass times acceleration

Mass must be in Kg

Acceleration must be in m/s/s

Calculating Force

Force is measured in ….

Newtons (N)

Weight is a Force: W=mg

Weight equals mass times acceleration due to gravity

Practice Problem

How much force is required to accelerate a 1200 Kg car at 15 m/s/s?

Practice Problem

How much does a 700 Kg hippo weigh?

Essential Questions:

What are the types of Friction?

How does friction affect the motion of an object?

How can you reduce friction?

Friction

A force opposing motion.

Any time two surfaces touch, there is friction.

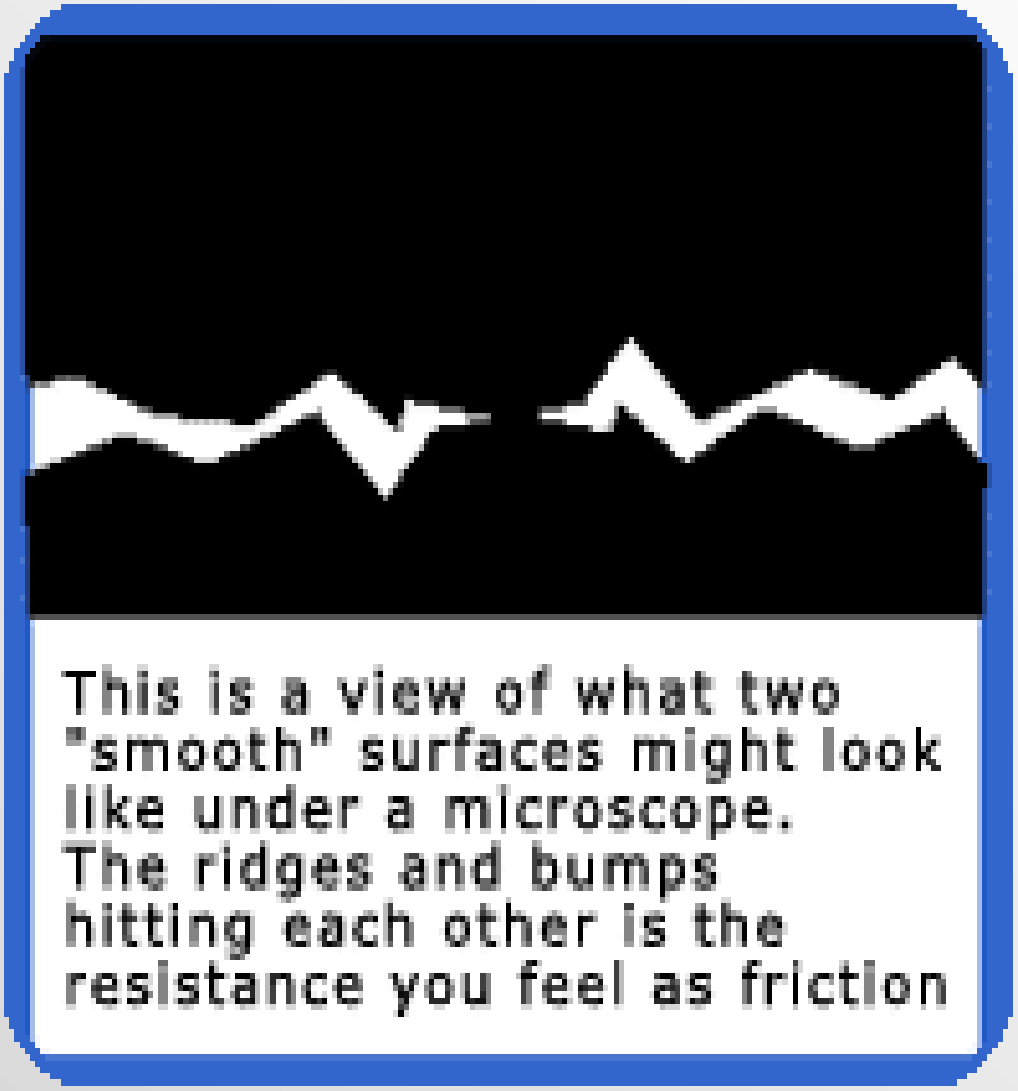
Friction acts in a direction opposite to an objects motion.

Friction

Friction will cause a moving object to slow down and eventually stop.

Friction

Amount of friction depends on how hard the surfaces are forced together and the materials of the surfaces.



Types of Friction

Static Friction – Friction between two surfaces that are not moving relative to each other.

Types of Friction

- **Sliding Friction – the Friction between two surfaces that are sliding over each other.**
- **Create the most Heat and Wear**

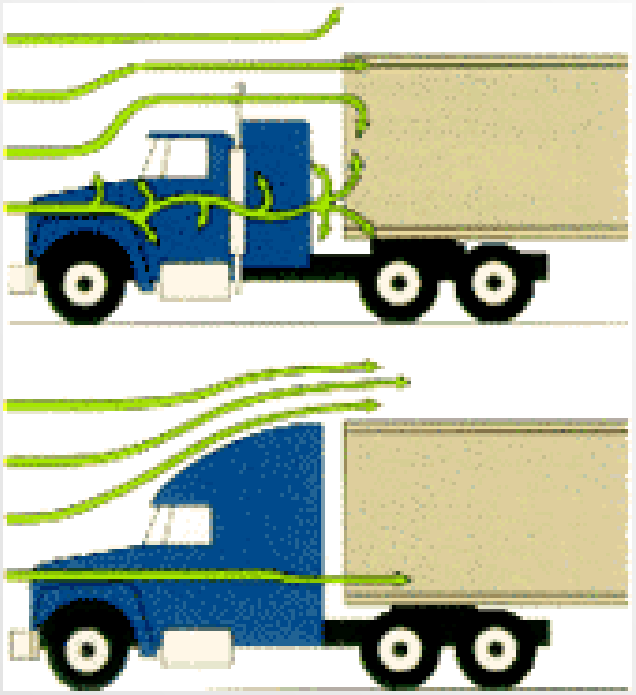
Types of Friction

Rolling friction – friction produced by objects such as wheels or ball bearing.

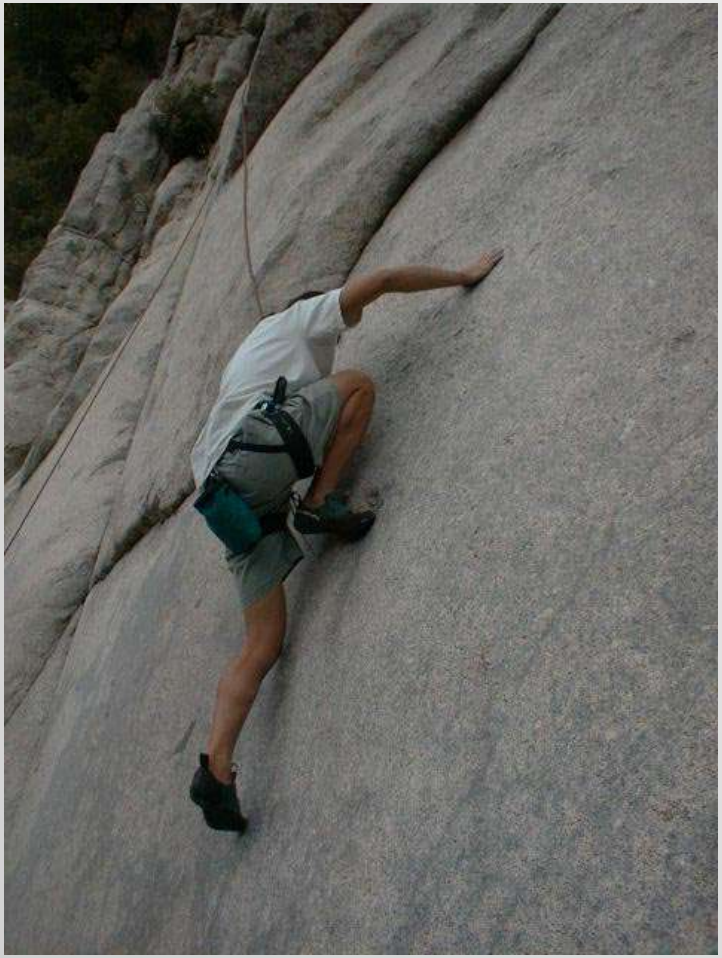
Types of Friction

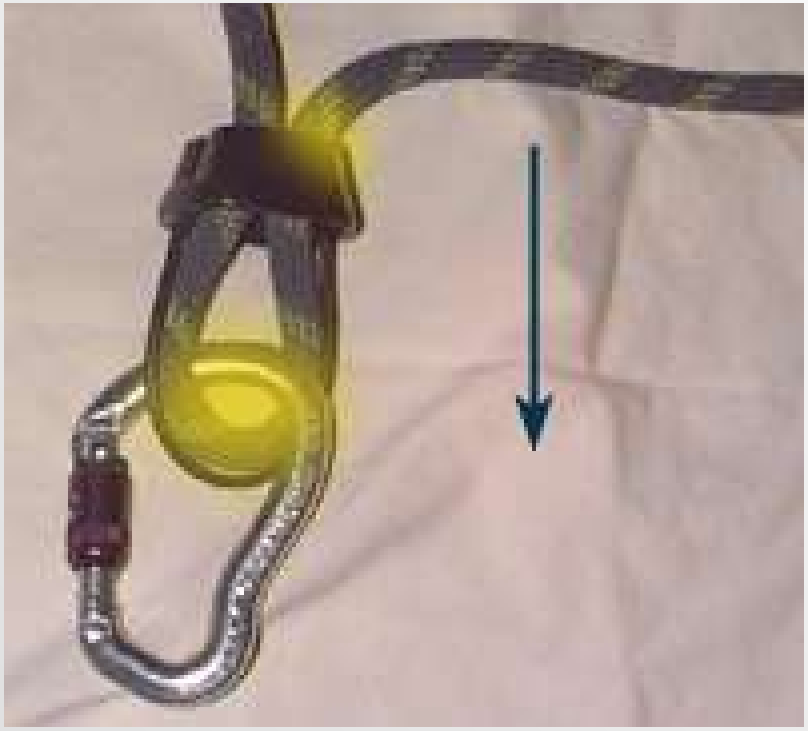
Fluid Friction – Occurs when an object moves through a fluid (water, air, etc.)

Air Resistance.



Is Friction a bad thing?





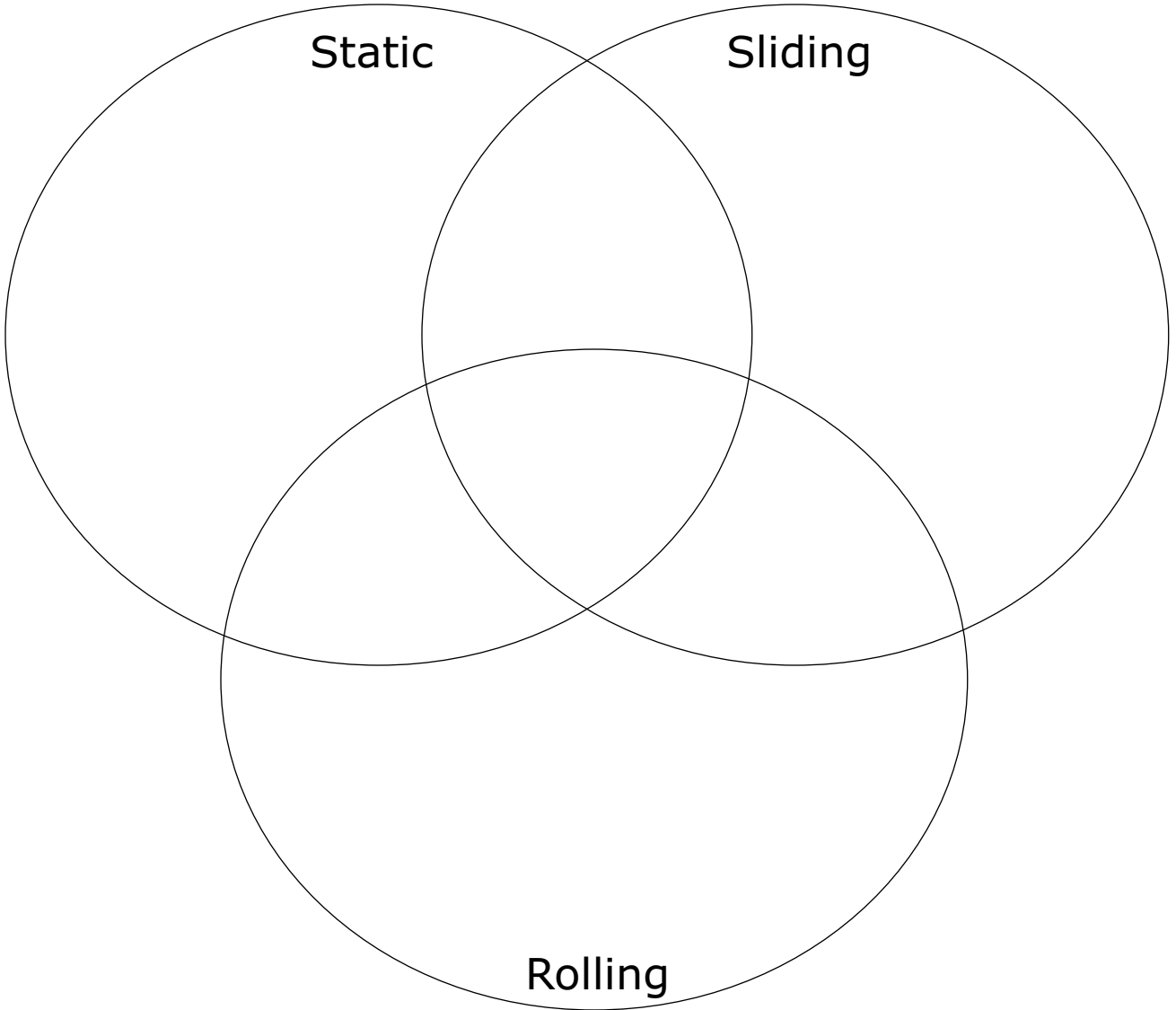
Ways to Reduce Friction

Change to rolling – add wheels.

Make the surface smoother.

Add a lubricant.

Venn Diagram to compare Static, Sliding and Rolling Friction



Your task

Construct a mobile or illustrated time line using pictures of automobiles or athletic clothing/ equipment that reflect the changes that have taken place in design over the last century.