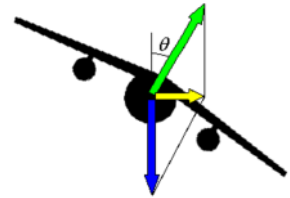
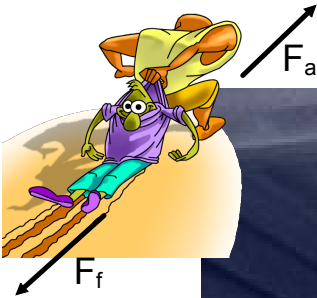


Inertia

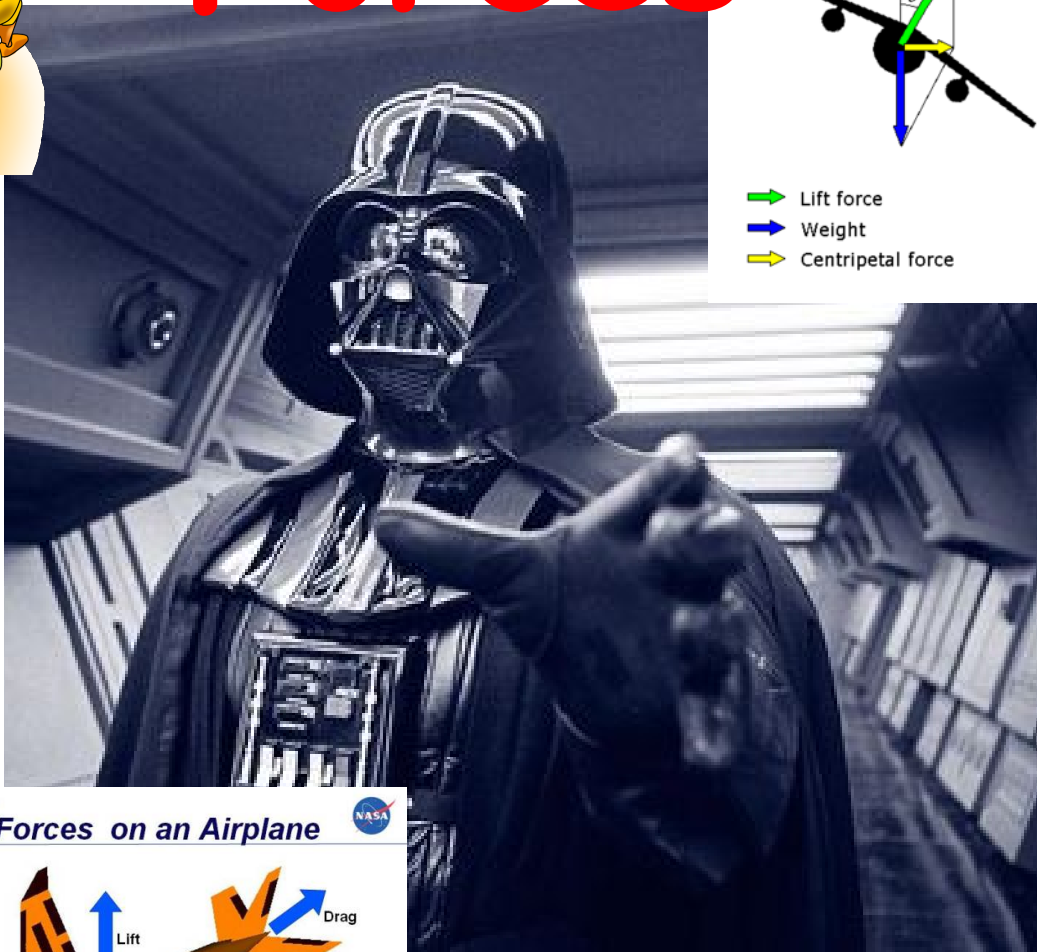
Do a close reading of pg. 126 - 128 of MHR

1. Define inertia.
2. Summarize Galileo's thought experiment on inertia.
3. Describe inertial and gravitational mass.
Are they the same?
4. What would happen, and why, if you kicked a bowling ball with the same amount of power as you would a soccer ball?

Forces

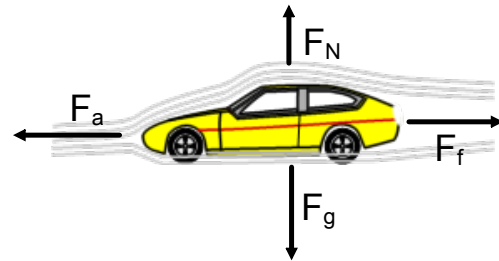
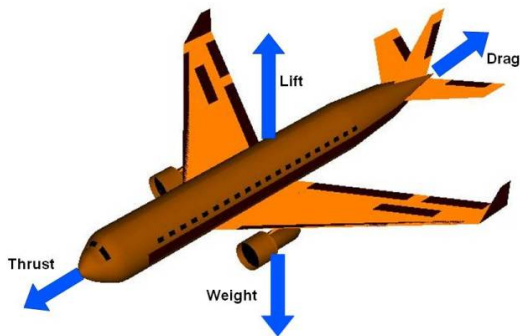


- Lift force
- Weight
- Centripetal force



National Aeronautics and Space Administration

Four Forces on an Airplane



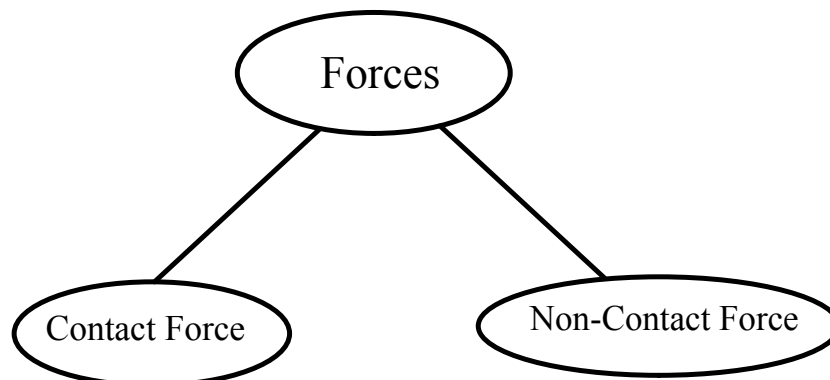
www.nasa.gov

Common Forces

A *force* is defined as a push or a pull.

They are vector quantities.

The sum of all the forces acting on an object is referred to as the resultant force. *Net force*, F_{net} , is another term used for the vector sum of forces.



a force exerted by an object in direct contact with another object

Examples

friction
tension
normal force
applied force

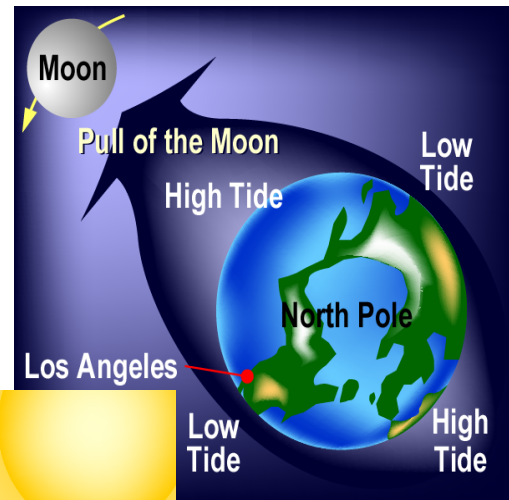
a force that acts over a distance

Examples

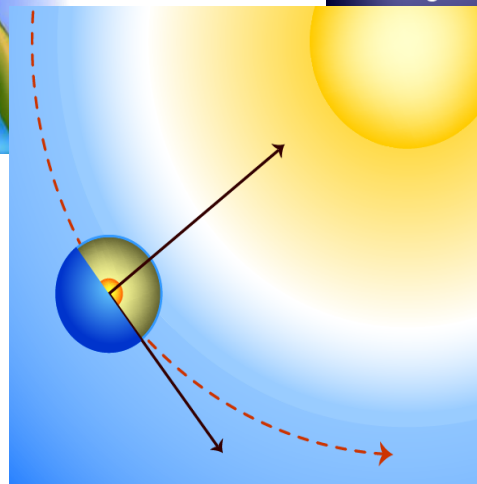
force of gravity
magnetic force
electric force

Many of the above forces can act on an object simultaneously, however, the process of problem solving for net force is independent of the type of force.

The Force of Gravity



F_g : gravitational force (force of *gravity*) - an attractive force that acts over a distance between masses



- What object is responsible for the tides on Earth, the Sun or Moon?
- What object pair has the stronger gravitational pull: Earth-Sun or Earth-Moon?

Did you know? That the interactions of the Earth-Moon tidal system is resulting in the Moon moving farther away and the Earth's spin is slowing down. Not to worry, it won't stop spinning or slow down all that much, but at some point in the distance future the Moon will only be visible from one side of the Earth.

Close Reading: Gravitational Force

Pg 130 - 133 of MHR

Terms to look for:

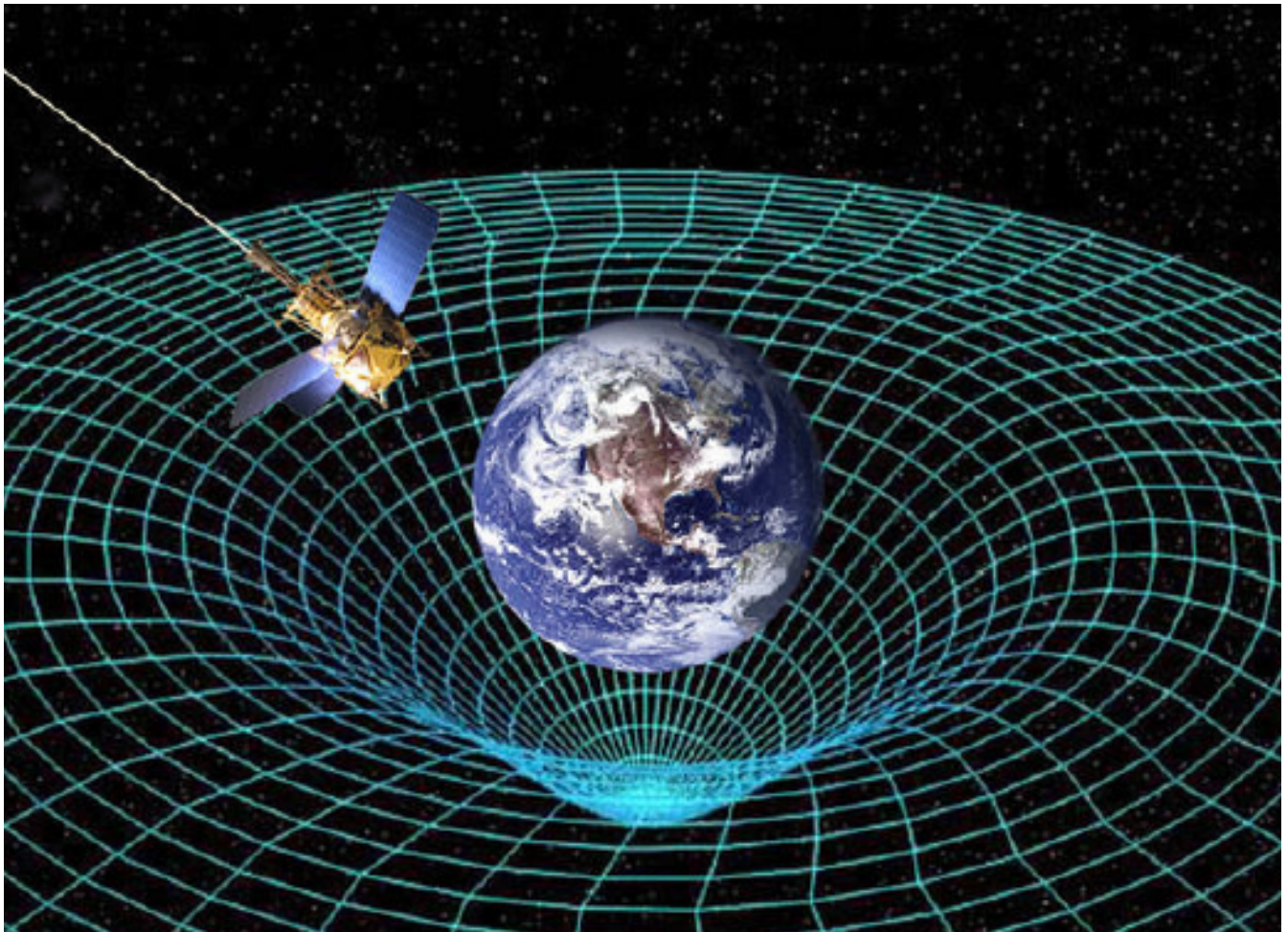
- Mass
- Weight
- Acceleration due to gravity $\rightarrow g = 9.81 \text{ m/s}^2$

Pair and write answers to the conceptual problems on page 131.

Discussion Question

The force of gravity is dependent on the distance between an object and the Earth; looking at the formula for the force of gravity, how or where is distance taken into account?

$$F_g = mg \leftarrow \text{To calculate this value: } 9.81 \text{ m/s}^2$$



Force of Gravity Practice Problems

1. Calculate the force of gravity on a 45 kg mass located at the peak of Mt. Everest.

$$F_g = ? \quad F_g = m g$$

$$m = 45 \text{ kg}$$

$$g = 9.7647 \text{ m/s}^2 \quad F_g = (45)(9.7647)$$

$$F_g = 439 \text{ Kg} \cdot \frac{\text{m}}{\text{s}^2}$$

N, Newton

$F_g = 439 \text{ N}$

2. At the equator a person has a weight of 1075 N, calculate his mass.

$$F_g = 1075 \text{ N} \quad F_g = m g$$

$$g = 9.7805 \text{ m/s}^2 \quad 1075 = m(9.7805)$$

$$m = ?$$

$$\frac{1075}{9.7805} = m$$

$109 \text{ kg} = m$

3. How many times stronger is the force of gravity at the bottom of the Mariana Trench than on the ISS? (assume the same object at each location)

$$F_{g \text{ M.T.}} = m g_{\text{M.T.}} \quad F_{g \text{ ISS}} = m g_{\text{ISS}}$$

Trench *ISS*

$$\frac{F_{g \text{ M.T.}}}{F_{g \text{ ISS}}} = \frac{\cancel{m} g_{\text{M.T.}}}{\cancel{m} g_{\text{ISS}}} = \frac{9.83}{9.07}$$

$\frac{F_{g \text{ M.T.}}}{F_{g \text{ ISS}}} = 1.08$

*Unless given a specific location, take the $g = 9.81 \text{ m/s}^2$ for an object located anywhere on the Earth.

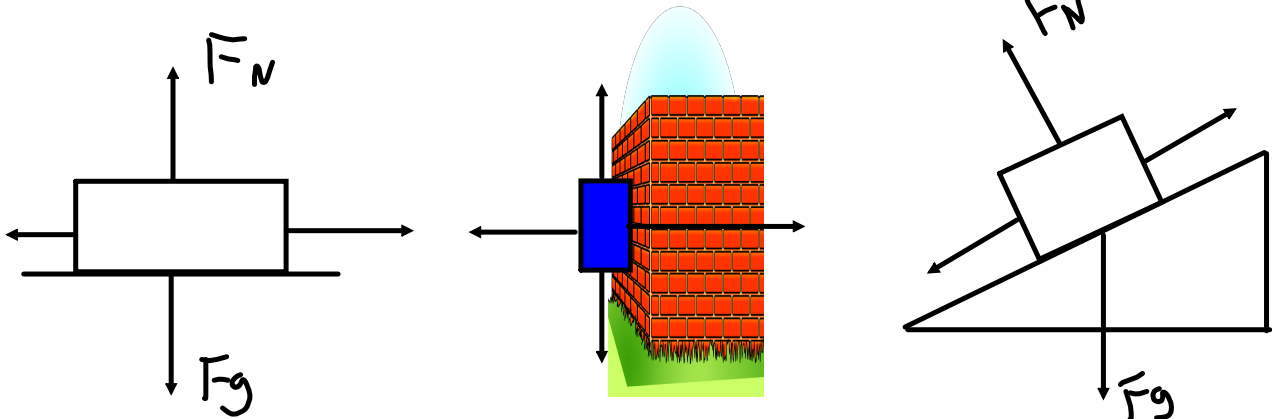
Practice Problems Pg 16 & 17.

Common Forces

F_a : an *applied* force
- a push or pull you exert on an object

F_N : the *normal* force
- a force that acts perpendicular to the surface where they contact.

NOTE: "normal" means perpendicular



F_T : *tension*
- the force that acts along a rope, wire, string, etc.

F_e : *elastic*
- the force that acts in a spring (elastic) opposite the direction it moves.

Attachments

forces-and-motion-basics_all.jar

forces-1d_all.jar