**Class Notes:**

**Gravity:**

All matter has gravity. If it has mass, it has gravity.

Gravity is infinite in range-it is everywhere!

It pulls toward the center (of gravity) for all objects.

**Law of Universal Gravitation:**

All objects attract each other. The amount of the force depends on the mass of the objects and the distance between them. Earth is usually the second object.

 Part 1 = Mass

As mass increases so does gravity.

Moon- less mass means less gravity

Jupiter- more mass means more gravity.

 Part 2 = Distance

As distance increases gravity decreases. Inverse relationship.

Go to Denver and lose weight.

Weight vs. Mass:

The force of gravity acting on an object. Measure of the amount of matter in an object.

Can change with location. Does not change with location.

Newtons (N) Kilograms

Measured with a scale. Measured with a balance.

**Acceleration due to Gravity:**

9.8 m/s/s for ALL OBJECTS on Earth.

Bowling ball vs. Golf Ball - They both fall at the same rate. The bowling ball has more inertia so it is harder to accelerate. Gravity pulls harder (it has more weight) because it has more mass. The opposite is true for the golf ball.

**Air Resistance and Falling Objects:**

Air is everywhere on Earth. As a result, objects don’t all fall with the same acceleration. Their shape and mass affect the air resistance (frictional force) acting to slow them down.

**Terminal velocity:**

When air resistance (force pushing up) equals the force of gravity (force pulling down) a falling object stops accelerating and then continues to fall at a constant speed. The shape and mass of the objects determine the final speed or terminal velocity.

**Free Fall**

Gravity is the only force acting on the object causing it to fall/accelerate. This only can happen where there is no air…like on the moon.

Satellites in orbit around the Earth.

**In orbit:**

Gravity is the source of the centripetal force that makes satellites constantly change their direction…go around.

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