**Force of Gravity**

On The Surface of the Earth

Remember Newton’s Second Law:

On the surface of the Earth acceleration due to gravity is:

Thus, at the surface of the Earth the force of gravity on an object is:

Ex. What is the weight of a 30kg dog?

What about things that are not on the surface of the Earth?

**Newton’s Universal Law of Gravitation**

Where:

G is

r is

Ex. Jerry has 75kg of mass and Tom has 65kg of mass. What is the gravitational force between Jerry and Tom when they have 1.22m between their centers of masses?

***g***

Use Newton’s Law of Gravitation to determine the acceleration due to gravity at the surface of the Earth.

Mass of the Earth = 5.98×1024kg

Radius of the Earth = 6.38×106m

**Proportionality**

Gravity and Mass

Gravity and Distance

Ex. On the surface of the planet Omicron Persei Eight, Frank weighs 500N.

1. What is Frank’s weight when his distance from the center of the planet is tripled?
2. Hermes has double the mass of Frank. What is Hermes’ weight on the surface of Omicron Persei Eight?