

## 1 | Earth's Gravitational Field

Extends infinitely large, but there is a point whereby it is imperceivable.

First, *Newton's Law of Universal Gravitation*.

$\vec{F}_g = -\frac{M_2 M_1 G}{R^2} \cdot \hat{r}$ , where  $G$  is the Universal Gravity Constant and  $r$  is a direction ("unit vector") that points from  $M_1$  to  $M_2$  (so  $\hat{r} = \frac{\vec{r}}{r}$ ).

Often, this is written as...

$\vec{F}_g = \frac{-GM_1 M_2}{r^3} \vec{r}$ . It is  $r^2$ , but doing this and multiplying it to  $\vec{r}$  is to resolve the need to rid of the direction.

## 2 | Potential Energy

**Whenever we talk about "energy", we are really talking about the CHANGE in energy.**

Potential Energy Location:

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