Notes: Weight (aka “the force of gravity on an object”)

Weight Formula

Recall Newton’s 2nd Law:

$$F = m\,a$$

Weight Formula

$$F_{Weight} = m\ g$$

F_{Weight}

m

g

Weight Formula

$$F_{Weight} = m\ g$$

F_{Weight} is the force of weight

m

g

Weight Formula

$$F_{Weight} = m\ g$$

F_{Weight} is the force of weight

m is the mass

g

Weight Formula

$$F_{Weight} = m\ g$$

F_{Weight} is the force of weight

m is the mass

g is the acceleration due to gravity [9.8 m/s^2 on Earth]

What is the weight of a baby with a mass of 3.5 kg?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
F_{Weight} = m = g =	

What is the weight of a baby with a mass of 3.5 kg?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = ?$ $m =$ $g =$	

What is the weight of a baby with a mass of 3.5 kg?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = ?$ $m = 3.5\ kg$ $g =$	

What is the weight of a baby with a mass of 3.5 kg?

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Givens	Work
$F_{Weight} = ?$ $m = 3.5\ kg$ $g = 9.8\ m/s^2$	

What is the weight of a baby with a mass of 3.5 kg?

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- Force of Weight - N

Givens

$F_{Weight} = ?$

$m = 3.5\ kg$

$g = 9.8\ m/s^2$

Work

$$F_{Weight} = m\ g$$

What is the weight of a baby with a mass of 3.5 kg?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens

$F_{Weight} = ?$

$m = 3.5\ kg$

$g = 9.8\ m/s^2$

Work

$$F_{Weight} = m\ g$$

$$F_{Weight} = (\ 3.5\ )\ (\ 9.8\ )$$

What is the weight of a baby with a mass of 3.5 kg?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = ?$ $m = 3.5\ kg$ $g = 9.8\ m/s^2$	$F_{Weight} = m\ g$ $F_{Weight} = (3.5) (9.8)$ $F_{Weight} = 34\ N$

<u>If your weight is 540 N, what is your mass?</u> What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
F_{Weight} = m = g =	

<u>If your weight is 540 N, what is your mass?</u> What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
F_{Weight} = 540 N m = g =	

<u>If your weight is 540 N, what is your mass?</u> What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = 540$ N m = ? g =	

<u>If your weight is 540 N, what is your mass?</u> What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = 540\ N$ $m = ?$ $g = 9.8\ m/s^2$	

<u>If your weight is 540 N, what is your mass?</u> What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = 540\ N$ $m = ?$ $g = 9.8\ m/s^2$	$F_{Weight} = m\ g$

<u>If your weight is 540 N, what is your mass?</u> What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = 540\ N$ $m = ?$ $g = 9.8\ m/s^2$	$F_{Weight} = m\ g$ $540 = m\ 9.8$

<u>If your weight is 540 N, what is your mass?</u> What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = 540\ N$	$F_{Weight} = m\ g$
$m = ?$	$540 = m\ 9.8$
$g = 9.8\ m/s^2$	$m = 55\ kg$

If your weight is 540 N, what is your mass? What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
F_{Weight} =	Mass does not change!
m =	55 kg on Earth = 55 kg on the Moon
g =	

If your weight is 540 N, what is your mass? What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
F_{Weight} = m = g =	

If your weight is 540 N, what is your mass? What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
F_{Weight} = ? m = g =	

If your weight is 540 N, what is your mass? What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
F_{Weight} = ? m = 55 kg g =	

If your weight is 540 N, what is your mass? What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = ?$ $m = 55\ kg$ $g = 1.6\ m/s^2$	

If your weight is 540 N, what is your mass? What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = ?$ $m = 55\ kg$ $g = 1.6\ m/s^2$	$F_{Weight} = m\ g$

If your weight is 540 N, what is your mass? What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = ?$ $m = 55\ kg$ $g = 1.6\ m/s^2$	$F_{Weight} = m\ g$ $F_{Weight} = (55) (1.6)$

If your weight is 540 N, what is your mass? What is your mass on the moon? How much would you weigh on the moon?

- Mass - kg
- Acceleration due to gravity - m/s^2
- Force of Weight - N

Givens	Work
$F_{Weight} = ?$ $m = 55\ kg$ $g = 1.6\ m/s^2$	$F_{Weight} = m\ g$ $F_{Weight} = (55) (1.6)$ $F_{Weight} = 88\ N$