



Phis's World

*Episode 3: Newton's 2nd Law -
Be Gentle If You Care*

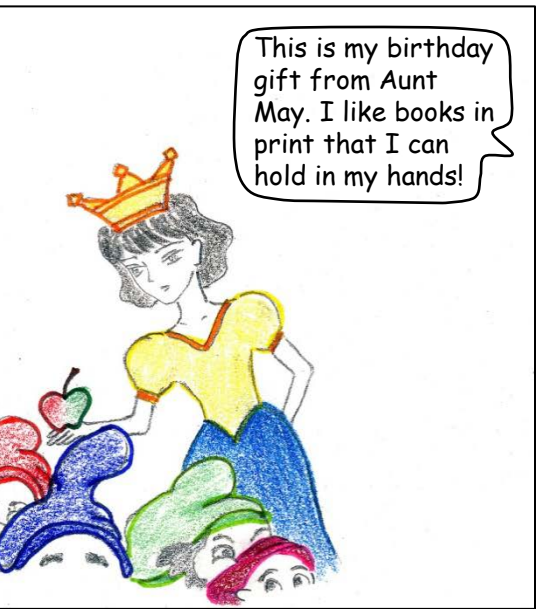


Illustration: Xia Hong

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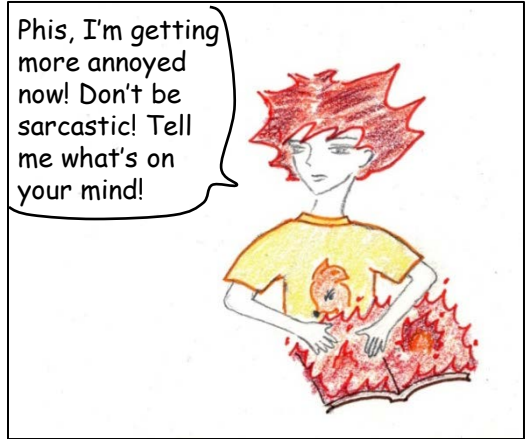
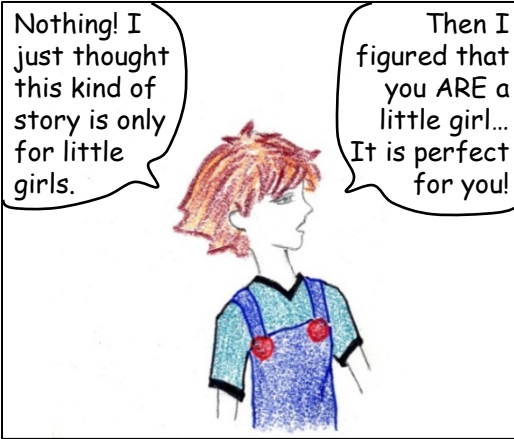
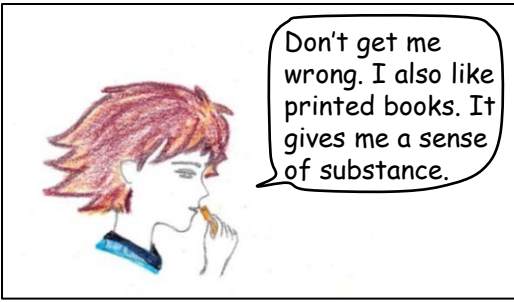
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Once upon a time...



Snow White and Seven Dwarfs





You know, since I started learning physics, I have started to notice a lot of things that previously had skipped my mind.
 For example, let's reconsider what happened to Snow White within:

Newton's 2nd Law

$$F = ma = \frac{\Delta p}{\Delta t}$$

Δ : change
 p : momentum
 t : time

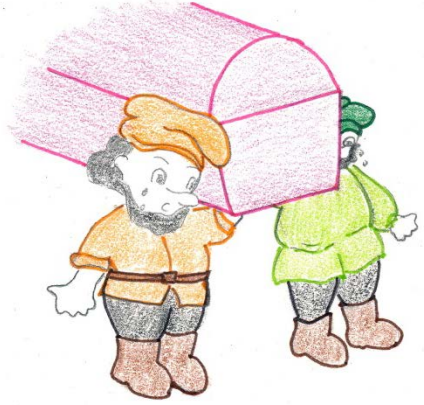
This means when there's no force applied, or $F = 0$, there should be no change in momentum, or $\Delta p = 0$.

On the other hand, to have some drastic changes in momentum, you need to apply BRUTAL force to the object, i.e. Snow White.

When we are at rest or moving in a constant motion, there is no change in p , so no force applied.



When Snow White was carried by the seven dwarfs, they were so gentle and moved in a constant speed so that there was no force exerted on Snow White.

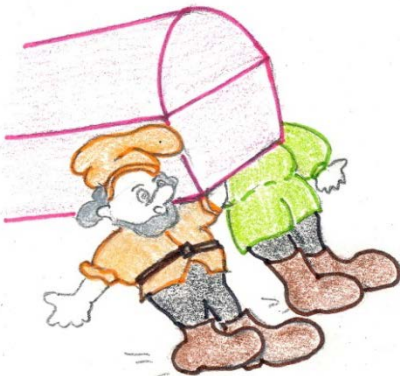


When there is a car crash, there is huge force generated.



And then...
Snow White met the prince...
How romantic... Err?

Oops!



He must have run over Snow White.
He was not gentle nor polite.
He did NOT care!

Let's come back to Snow White:

To stop her from choking on the apple, there is a huge change in momentum p in a short period of time t .

Δp : large

Δt : small

Newton's 2nd Law

$$F = ma = \frac{\Delta p}{\Delta t}$$

► **F : HUGE !**

Like in a car crash, there must be huge force generated when the prince runs over Snow White.

CONCLUSION:

**THE PRINCE DID NOT CARE
ABOUT SNOW WHITE !**

Now let me ask: If he didn't care about Snow White as a country girl he met in the first place—

**What made him
decide to marry her?**



Her beauty?

Her royal blood?



**Or her status as
the sole heiress
of a kingdom?**



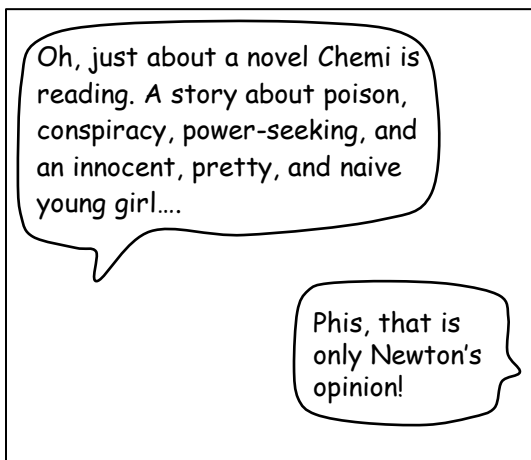


Any other questions? About Snow White or Newton's 2nd Law?

$$F = ma ?$$

Err, yes! You have not told me yet—what is m ? And what is a ?

Dad! You are home.



To read more about the stories of Phis, please visit us at www.physics.unl.edu/~xhong/hong/Phis/PhisHome.html.



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