



# WEIGHTLESSNESS

*exploring the wonders of gravity*

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# What is mass?



# What is weight?



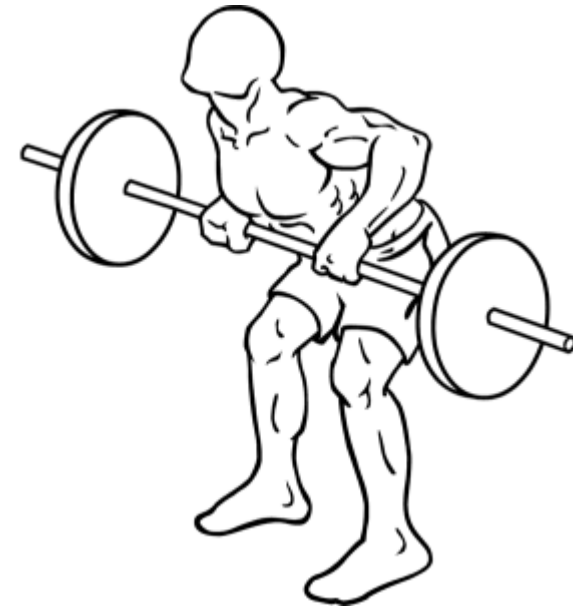
# How are they different?



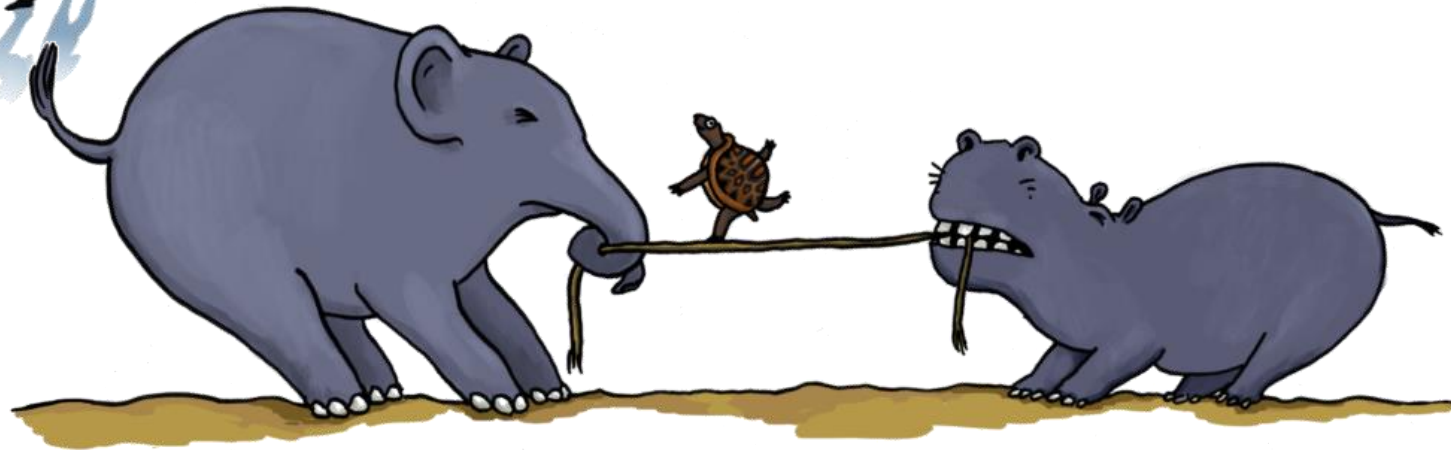
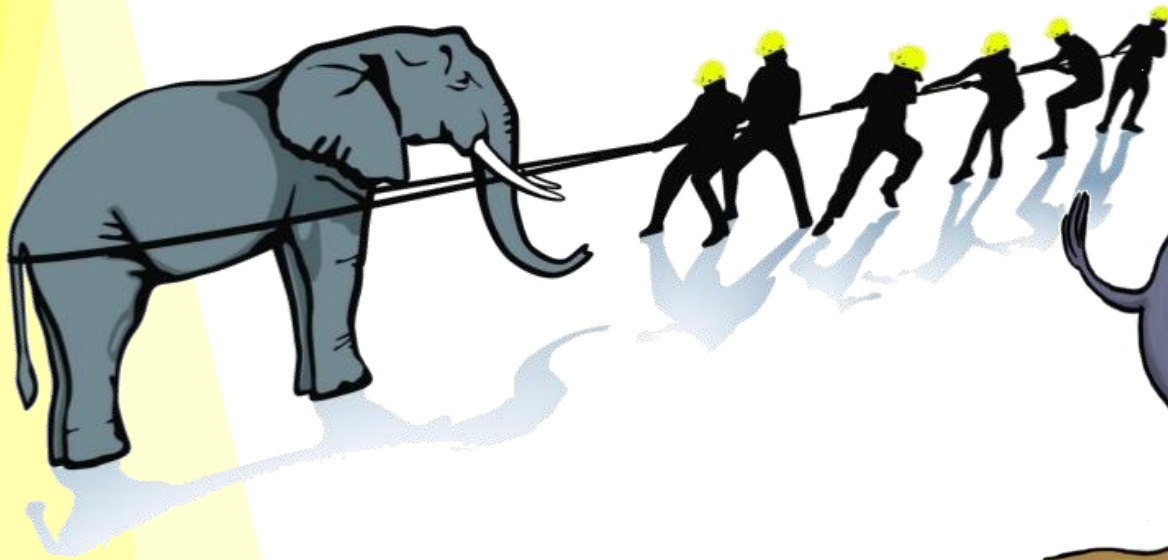
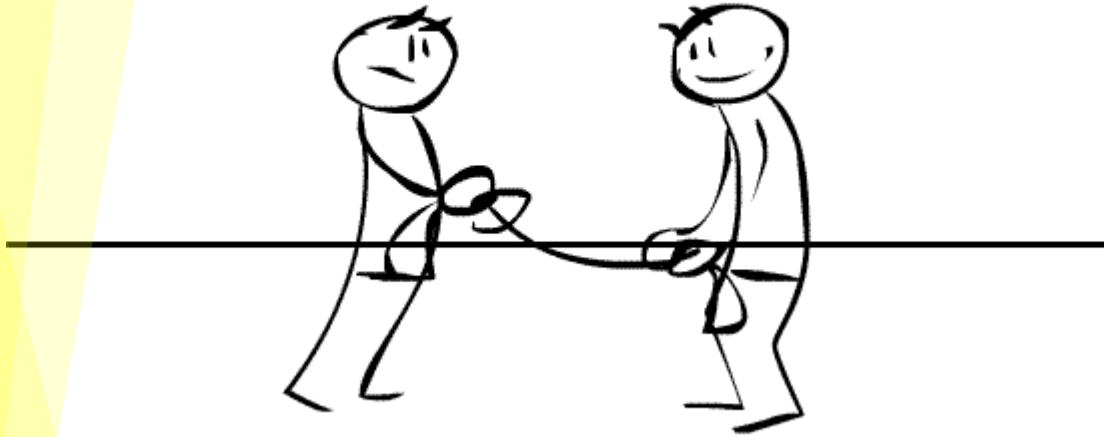


Mass is a measure of substance or matter that make up an object

Weight on the other hand is the measure of heaviness of a body



# Who will win?!



# Why do things fall back down on Earth?

Because of Gravity!

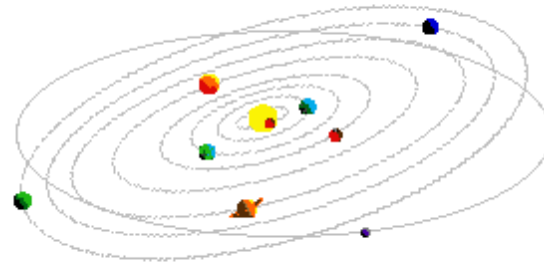
## *So what is Gravity?*

*It is an attraction between two distinct masses. The greater the mass of a body, the greater is its pull.*

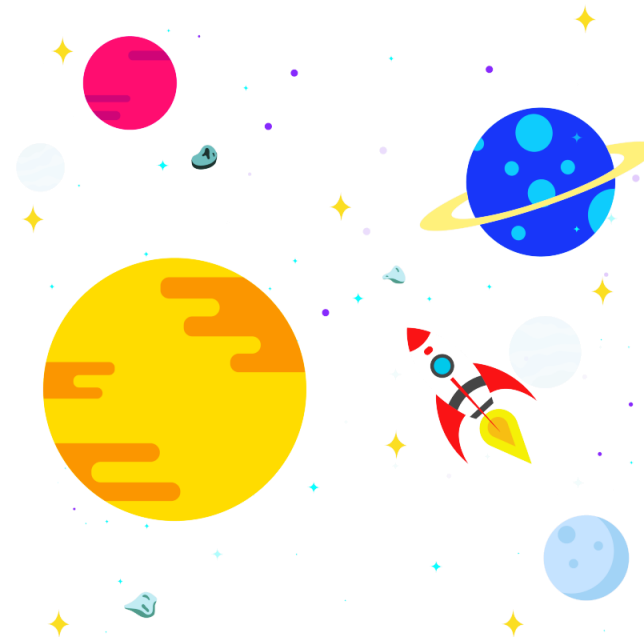
*Is it like attraction between magnets?*

*Yes and No!*



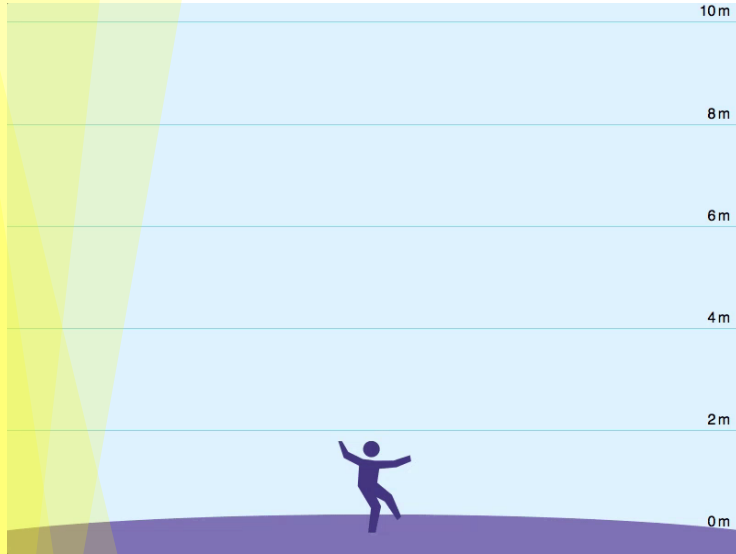


The same condition works for planets and stars too!  
One of the many reasons why we cannot jump off  
to space...

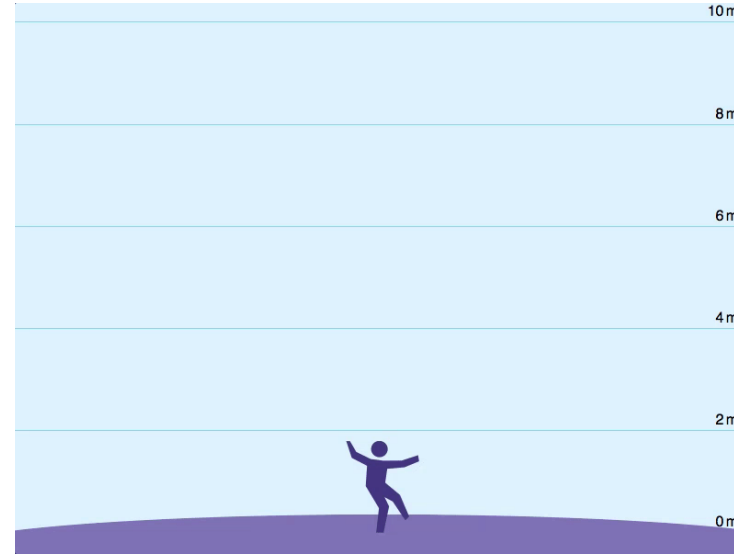




# How high will you jump on other worlds in space?



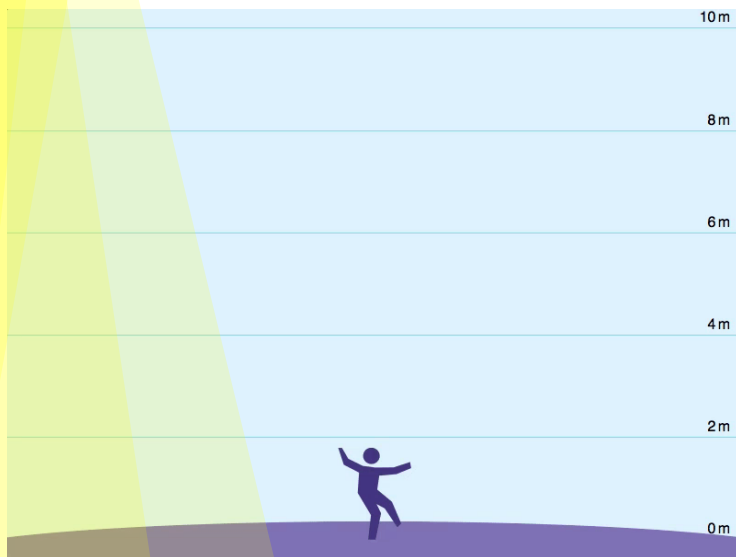
**Earth**



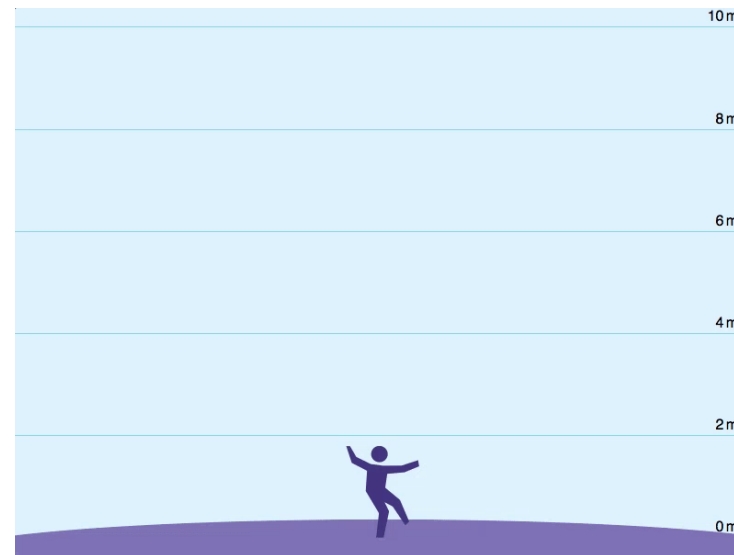
**Moon**



**Mars**



**Pluto**



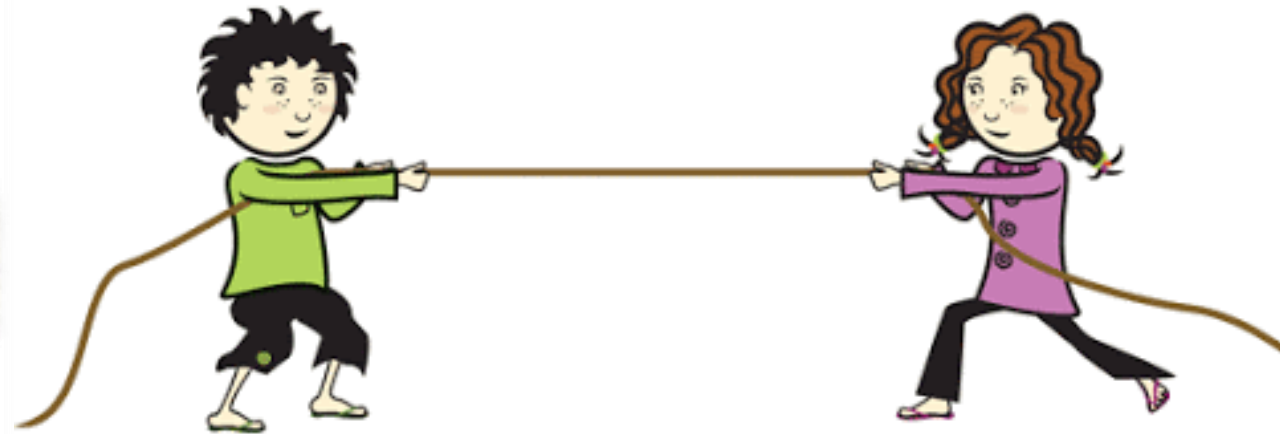
**Comet 67P**

**Source:**

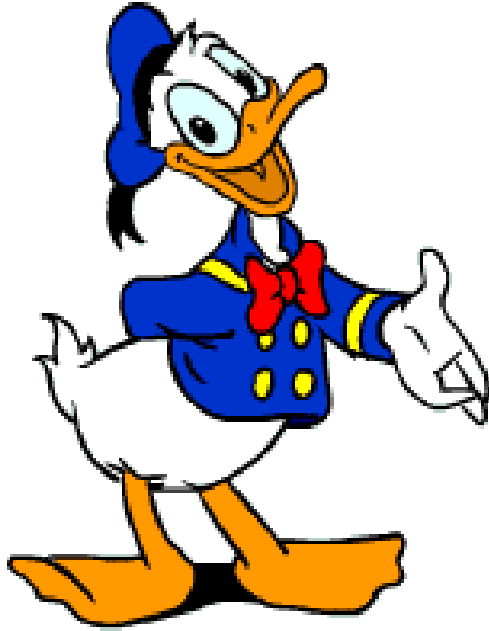
<https://www.sciencealert.com/here-s-how-high-you-could-jump-on-other-worlds-in-the-solar-system>

***What will happen if there is  
no one to resist?***

?

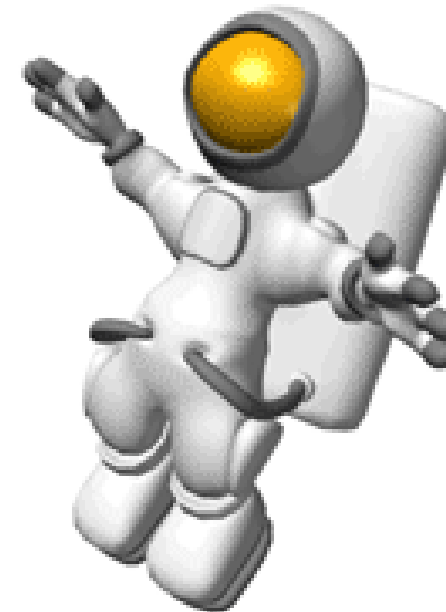




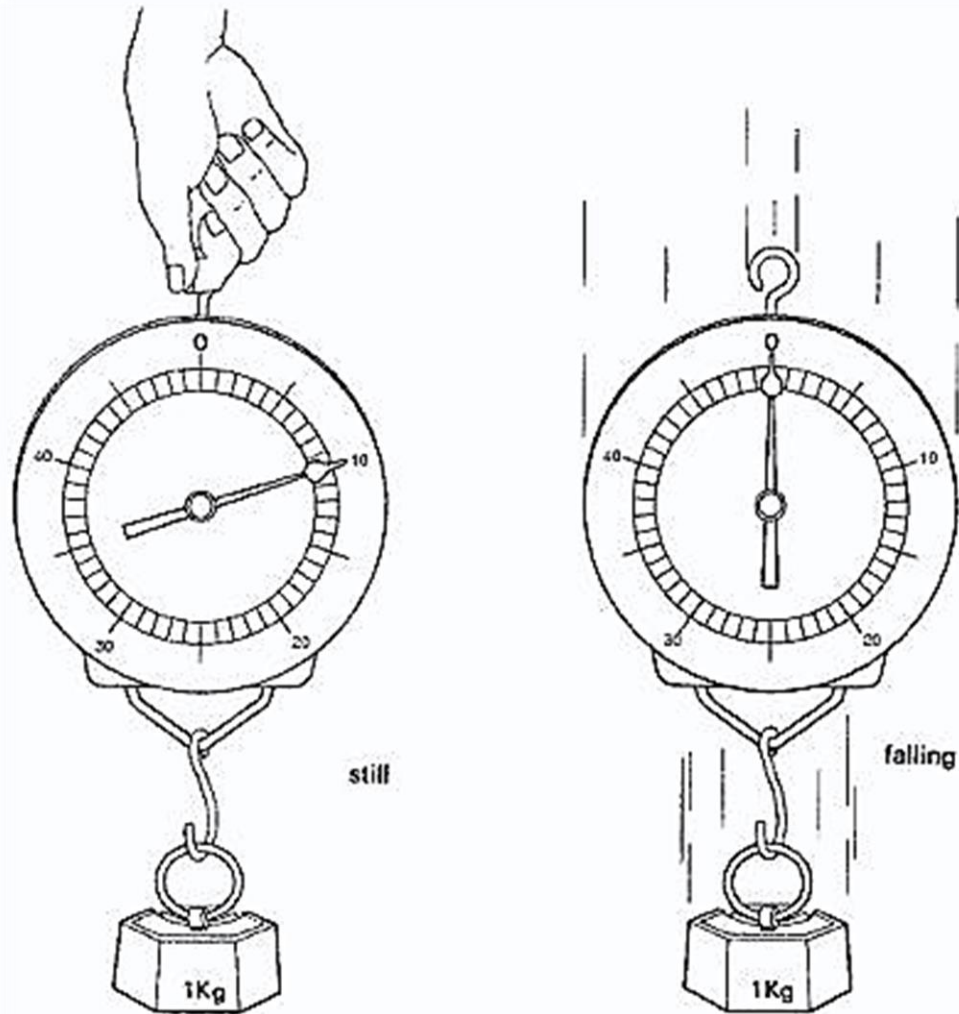


Weightlessness is simply a sensation experienced by an individual when there are no external objects touching one's body and exerting a push or pull upon it.

Weightless sensations exist when all contact forces are removed.



# *Weightlessness simplified!*





# Is gravity absent in Space?

# How do astronauts float around in Space?

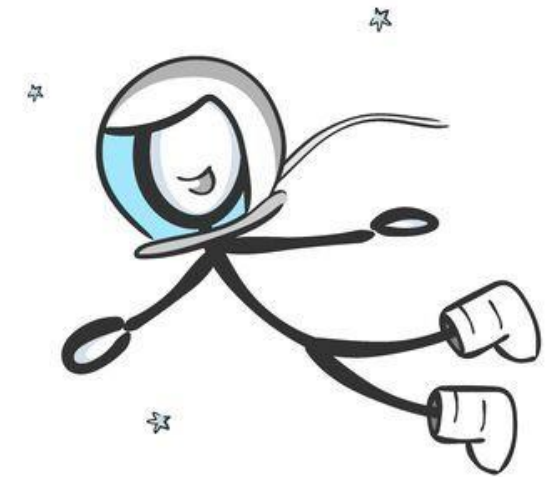




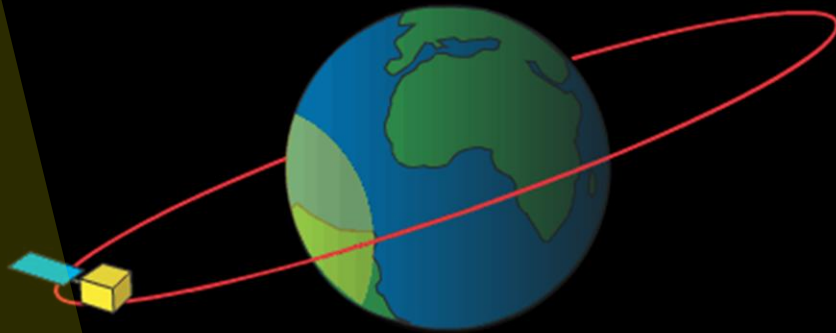
Astronauts experience the sensation of being weightless because they are not under the influence of any contact force



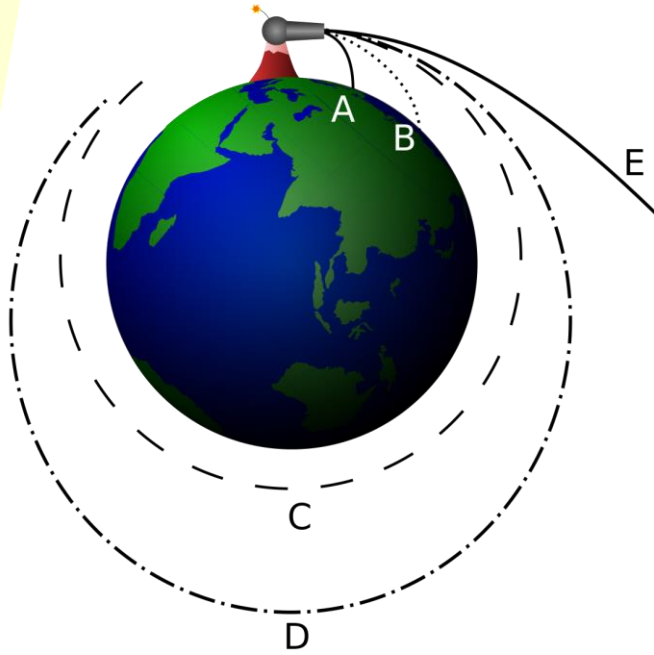
## *Why don't satellites and astronauts fall down?*



*In fact, all satellites and astronauts orbiting Earth are falling continuously!*

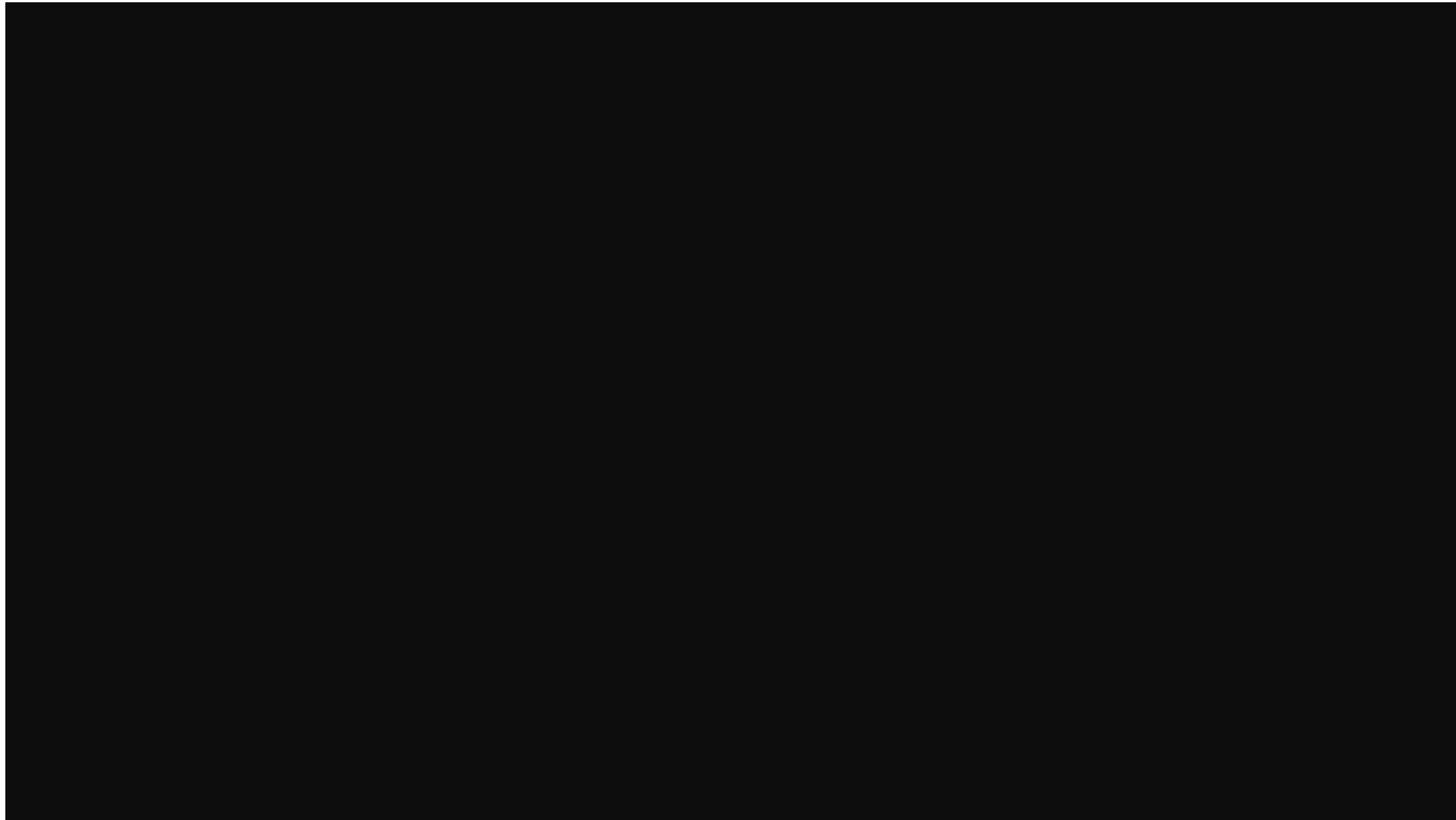






## *Newton's Cannonballs*





**Free Falling in Outer Space – Matt J. Carlson (TED-Ed)**

**Source:** <https://www.youtube.com/watch?v=tAUXIEr-VzM>



**Clip from 'Richie Rich Season 2 Episode 4'**

**Source:** <https://www.youtube.com/watch?v=ZTbfmHDbXzw&t=452s>

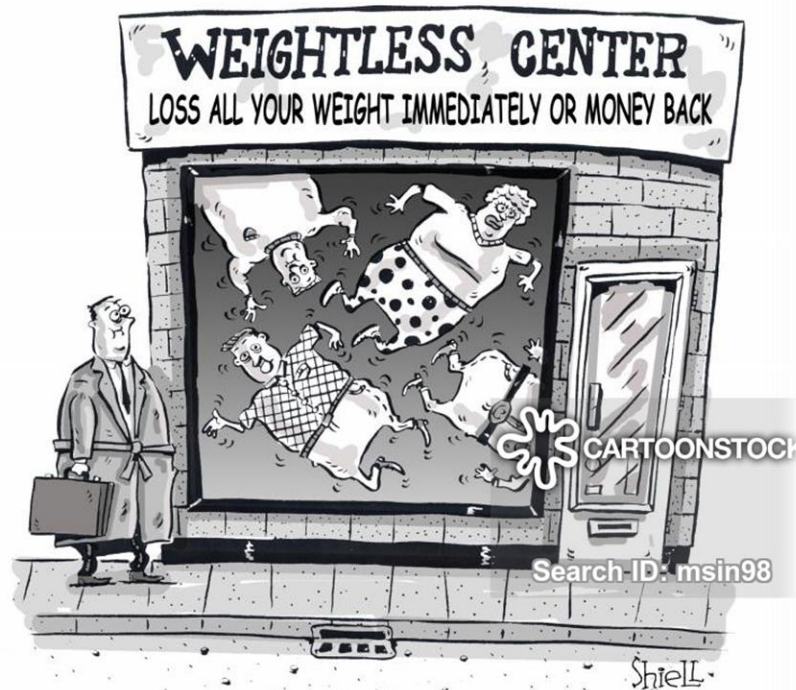
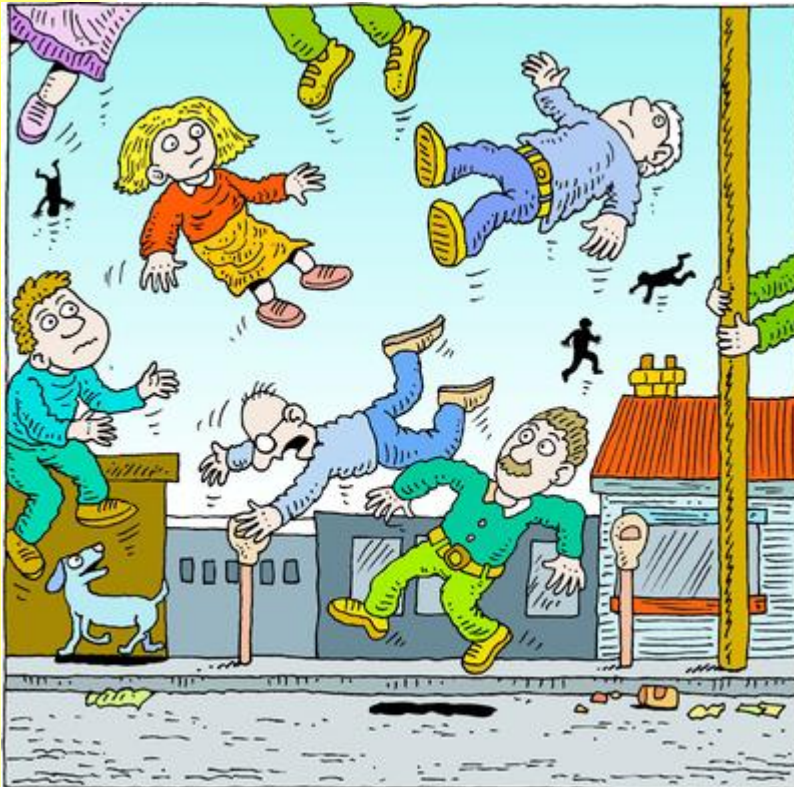
# Does gravity act only when we look down?





# Can we experience Weightlessness in day to day life?

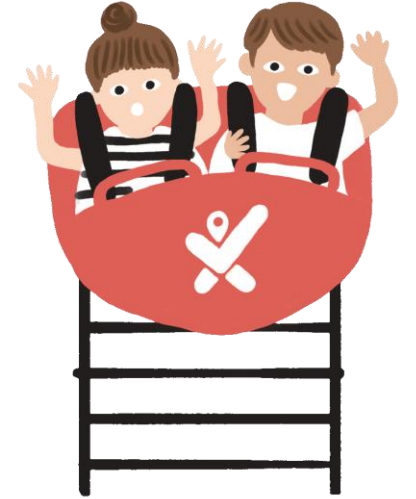
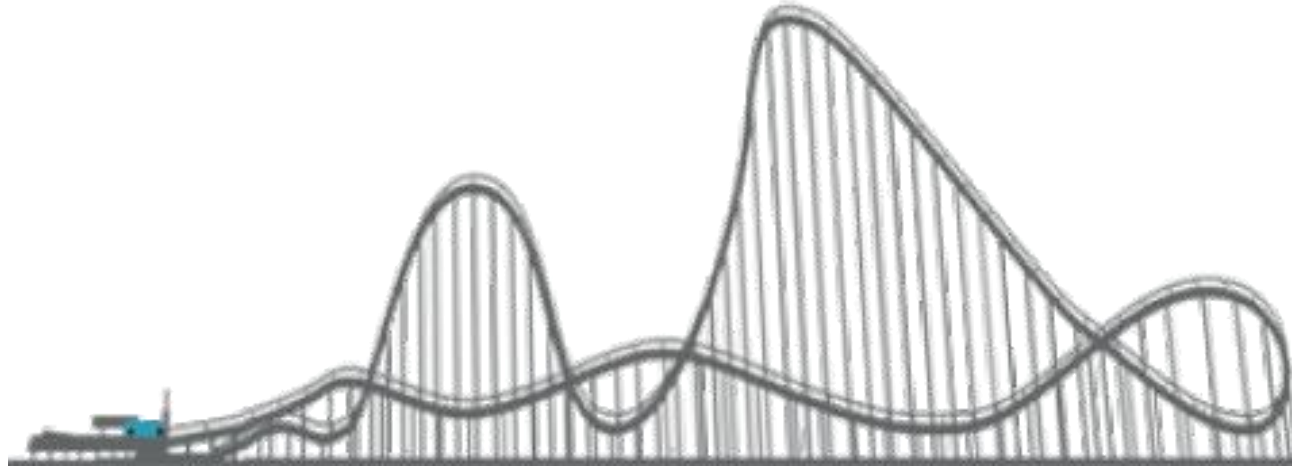
Yes!

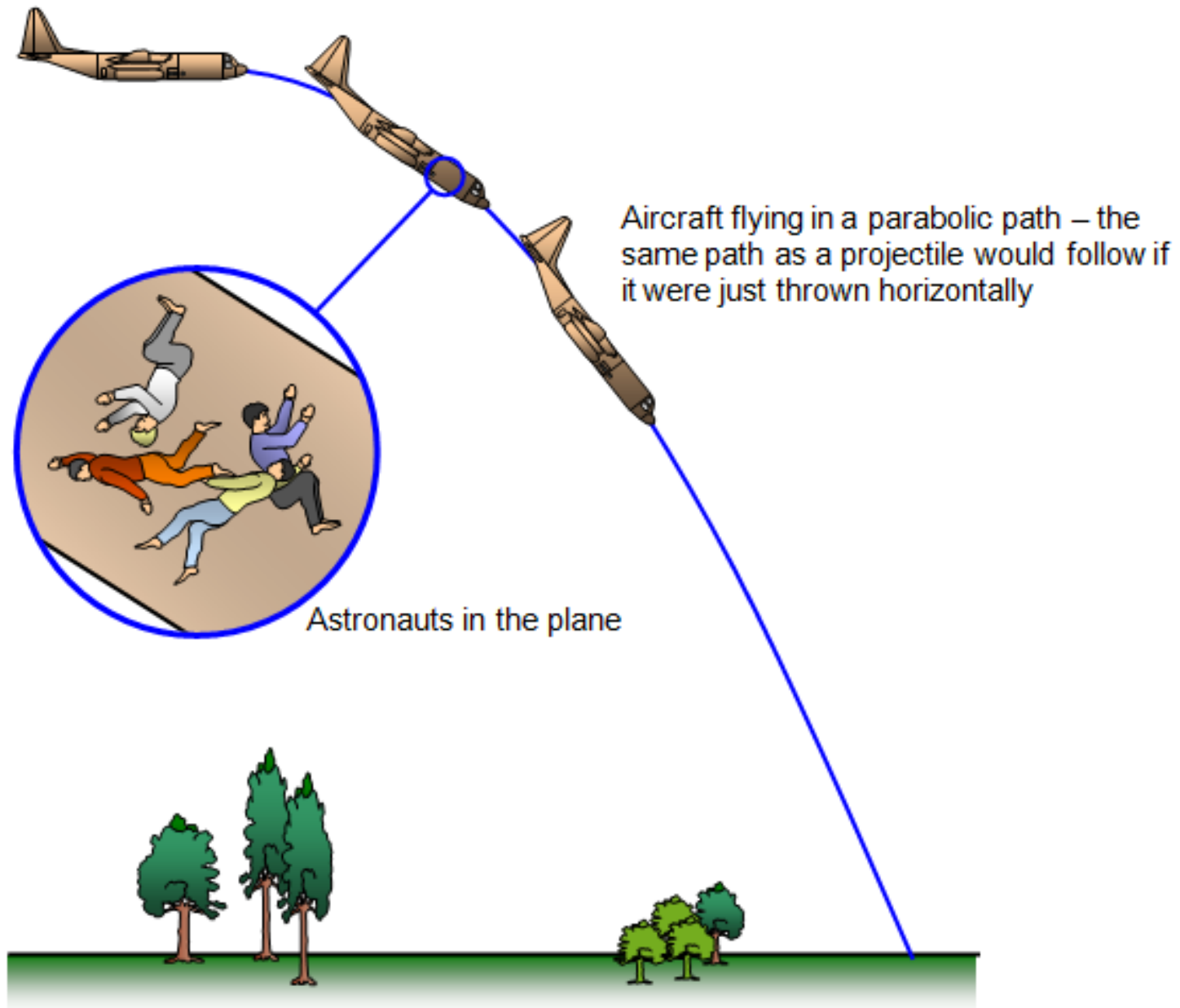




More properly, this effect is called apparent weightlessness, because the gravitational force can still be felt due to air resistance.









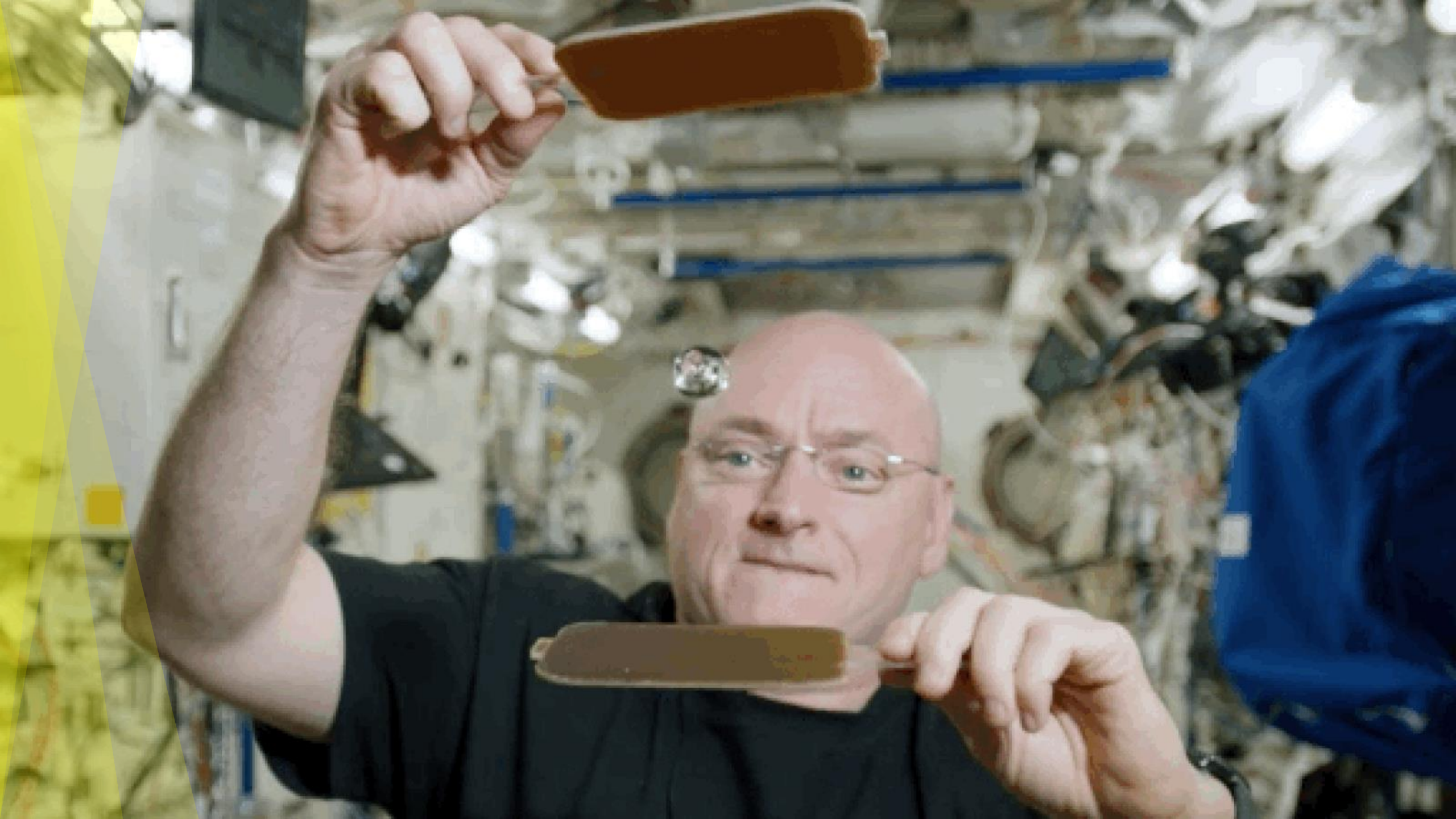




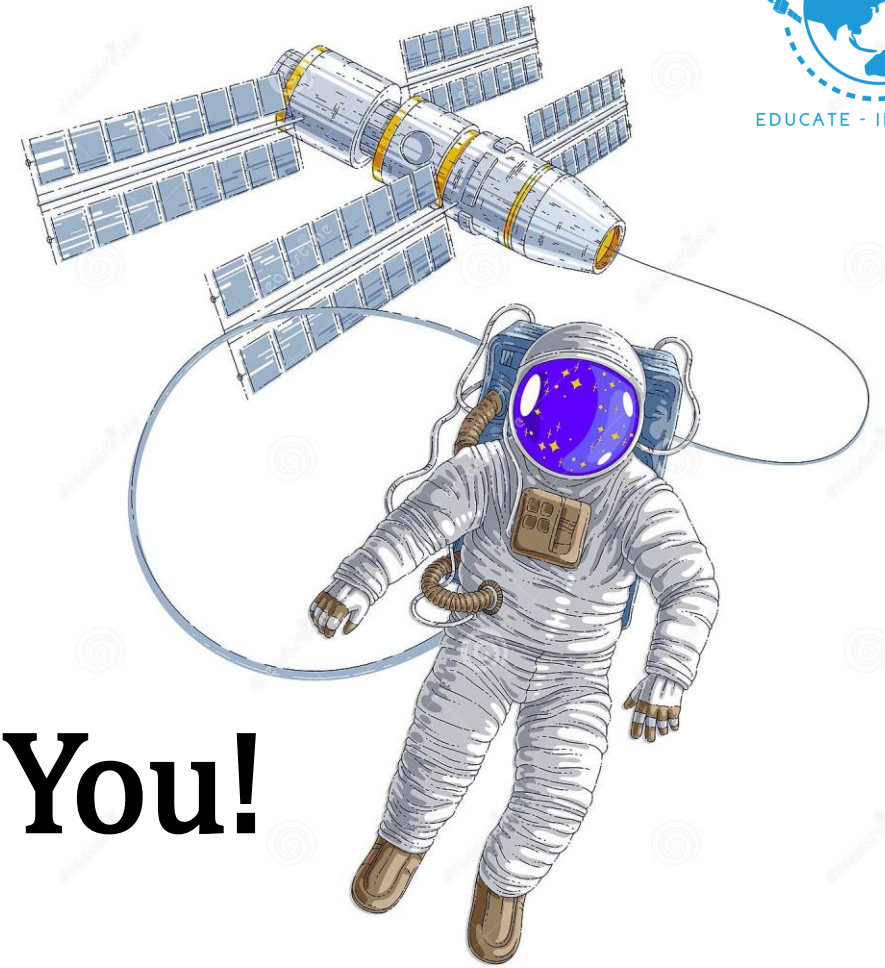
**Clip from 'I got to be Weightless for 7.5 minutes' – Simone Giertz**

**Source:** <https://www.youtube.com/watch?v=u9pkjHWAZLs>









# Thank You!

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