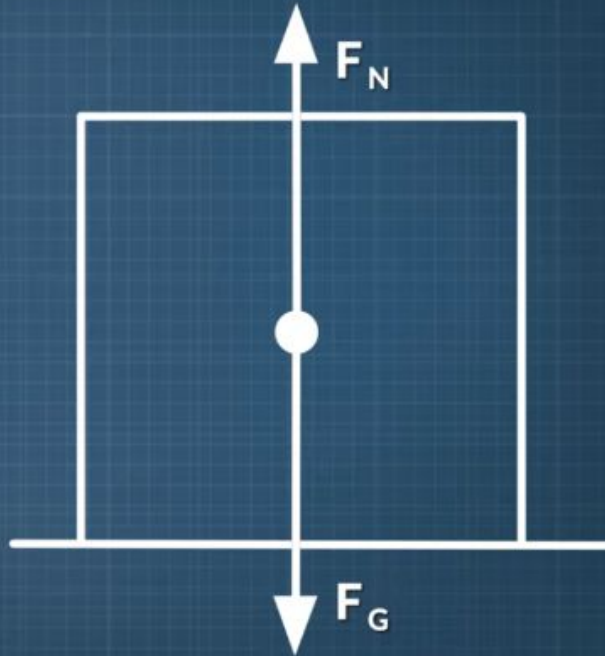


Free Body Diagram Project



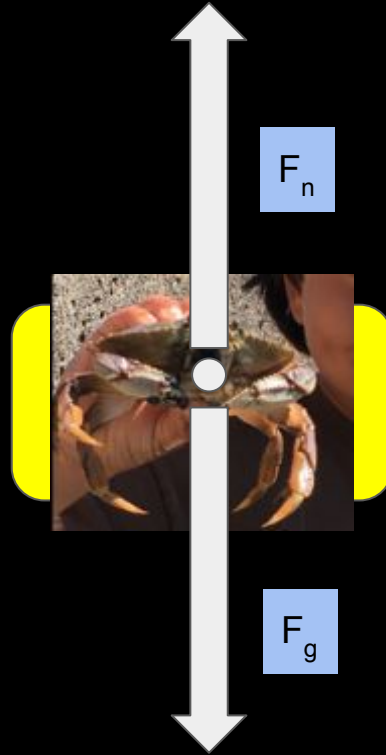
Physics 9

Ms Barrantes

Austin Horner

2023-1-5

CRAB FREE BODY DIAGRAM



Balanced force.

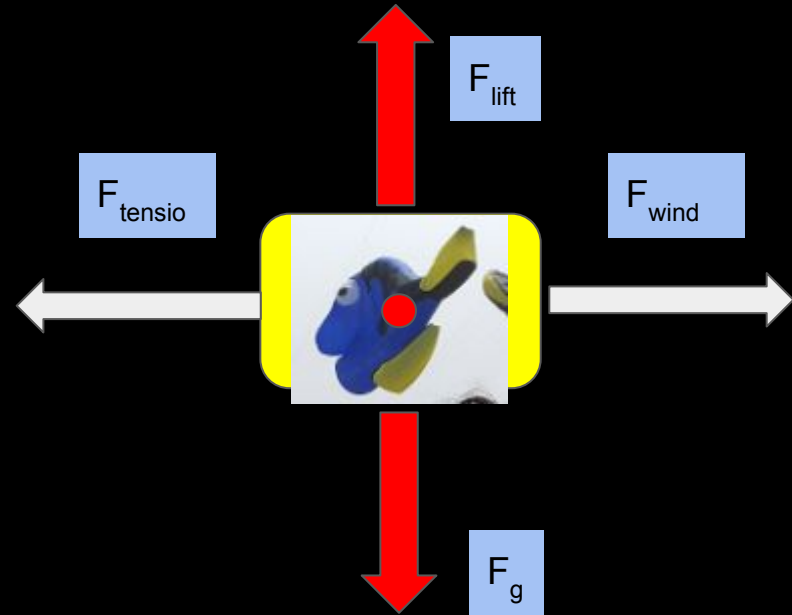
Not accelerating because gravitational force of crab's weight is balanced by hand.

All 3 Newton's laws apply: especially 2nd $F=ma$ and 3rd action / reaction.

HOVERING KITE FREE BODY DIAGRAM



Celeste and Austin Horner at the kite festival in Lincoln City, OR in 2017. Photo: Marianni Thompson.

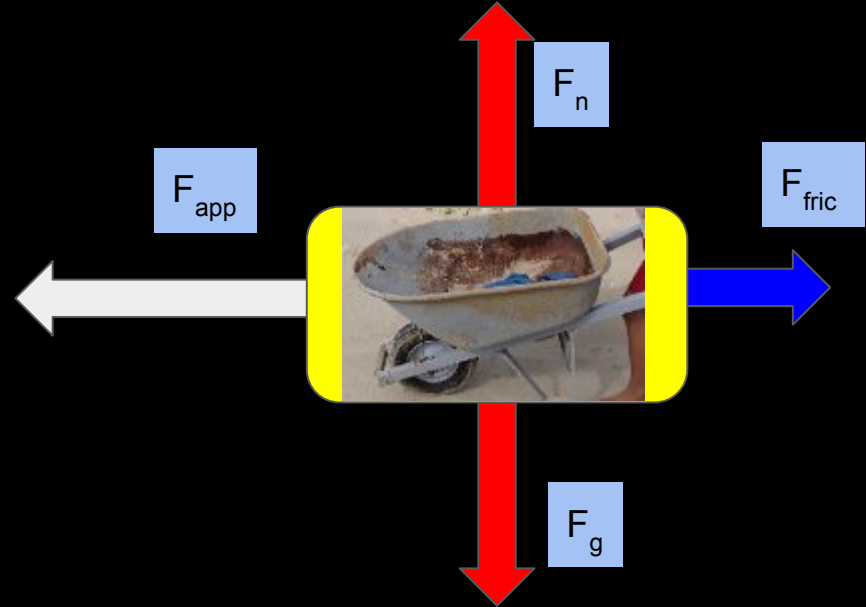


Balanced force. **Not Accelerating** balance of wind and string tension, weight and lift. **All 3 Newton's laws apply:** especially 2nd $F=ma$ and 3rd action / reaction.

WHEELBARROW FREE BODY DIAGRAM



Austin Horner in 2019 pushing a wheelbarrow on the beach in Waldport, Oregon. Photo: Celeste Horner.



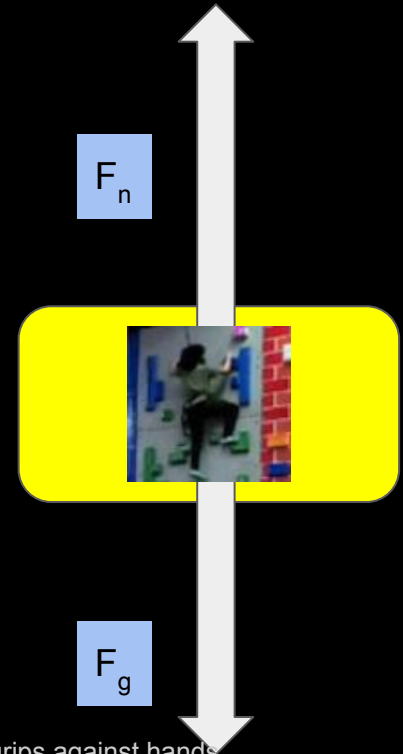
Unbalanced force in horizontal direction. **Accelerating** due to applied force. Sand friction resists the forward motion. **All 3 Newton's laws apply:** 1st Inertia; 2nd $F=ma$; and 3rd action / reaction.

WALL CLIMBING FREE BODY DIAGRAM



Austin Horner in December 2022 in a trampoline and climbing gym in Texas. Photo by Emma Burke.

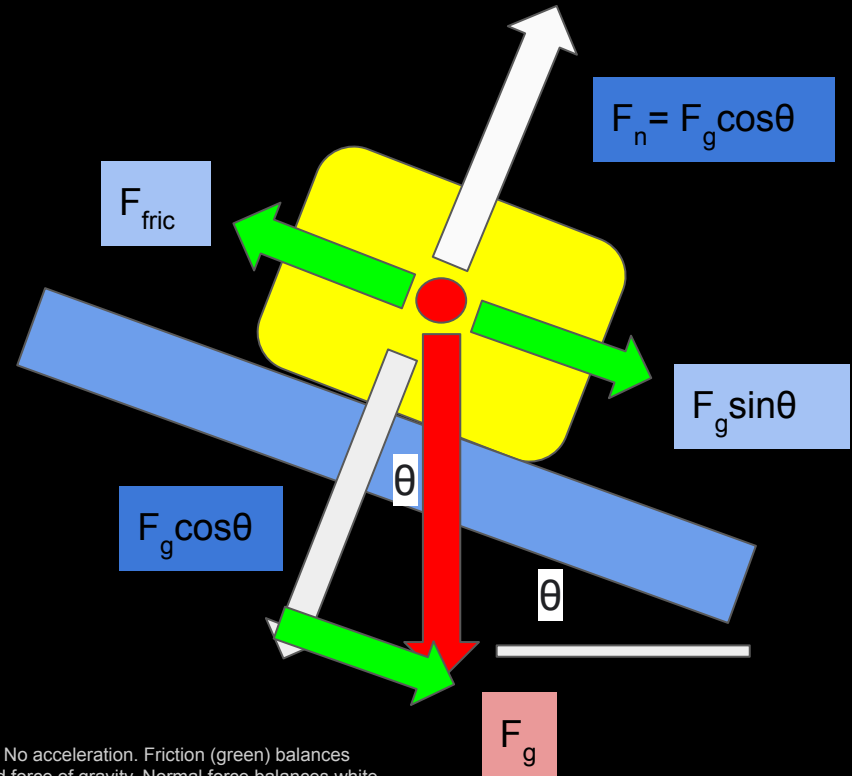
Balanced force. **Not accelerating** when in one position. Gravitational force down is balanced by force of the wall grips against hands and feet. **All 3 Newton's laws apply**: especially 2nd $F=ma$ and 3rd **action / reaction**. When belaying down, the tether tension up to the ceiling balances weight down.



SLIDE CLIMBING FREE BODY DIAGRAM



Austin Horner climbing a slide in Newport, OR (2018). Photo by Celeste Horner



Balanced force while standing on slide. No acceleration. Friction (green) balances $F_g \cos \theta$ (green) component of downward force of gravity. Normal force balances white component of gravity. **Newton's 3rd law** of action and reaction is most important here. Unbalanced force when climbing forward.

BOWLING BALL FREE BODY DIAGRAM



Austin Horner Halloween bowling at the alley in Toledo, OR. (October 2018) Photo by Celeste Horner.

Balanced force.
Not accelerating because gravitational force of bowling ball weight is balanced by the hand.
All 3 Newton's laws apply: especially 2nd $F=ma$ and 3rd **action / reaction**.

PIGGYBACK DOG FREE BODY DIAGRAM



Austin Horner (January 2020) giving dog Mijj a piggy-back ride on the beach in Walport, OR.
Photo by Celeste Horner.

Balanced force.

Dog not accelerating because gravitational force down balanced by the shoulder.

All 3 Newton's laws apply:
especially 2nd $F=ma$ and 3rd
action / reaction.

CREDITS

Burke, Emma

Austin Horner climbing in a trampoline gym. 2022

Horner, Celeste Claire

Austin Horner holding a crab. 2016

Celeste and Austin Horner at the kite festival. 2017

Austin Horner pushing a wheelbarrow on the beach. 2019

Austin Horner climbing a slide. 2018

Austin Horner bowling in Halloween costume. 2018

Austin Horner giving dog Mijji a piggy back ride. 2020.

Thomas, Marianni

Celeste and Austin Horner at the Lincoln City kite festival. 2017