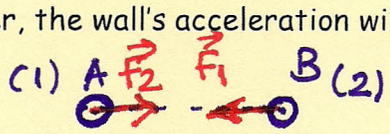
Note Taking Guide - Episode 404 - Pt 1

Newton's 3rd Law of Motion: Law of interaction (action and reaction)

- For every action force, there is a reaction force
- of equal magnitude in the opposite direction.

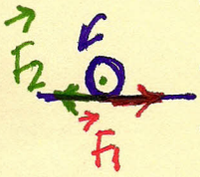
When a small lab cart hits a wall, the forces acting on the cart and wall are equal, but the acceleration of the cart and wall are different.
Because the mass of the wall is much greater, the wall's acceleration will be much smaller



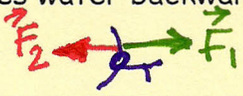
Action-Reaction forces do not cancel out.
Action-Reaction forces involve 2 objects and 2 forces.

$\vec{F}_1$ = action
$\vec{F}_2$ = reaction
$F_1 = F_2$ | $\vec{F}_1 = -\vec{F}_2$

action - A acts on B
reaction - B acts on A



The car's tires push back on the road and the road pushes the car forward (F_2)
A swimmer pushes water backwards and the water pushes the swimmer forward



Action (A acts on B)	Reaction (B acts on A)
Kangaroo pushes down on ground.	The ground pushes the kangaroo up.
Ball hits head.	The head hits the ball
Windshield hits bug with force of 10 N.	The bug hits windshield with F=10 N.
Dentist pulls up on tooth.	The tooth pulls dentist down.
Helicopter blades push air down.	The air pushes the blades up.

Challenge - Why is this not an action-reaction pair?

Action and reaction forces act on 2 different objects.

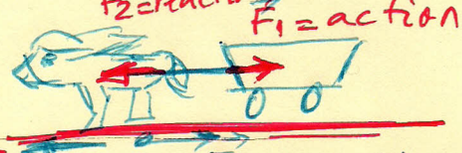
Name the 2 action-reaction pairs.

1. Leaf pushes down on air
2. Air pushes up on leaf
3. Earth pulls down on leaf
4. Leaf pulls down on earth

horse and cart problem (~~on back~~)

The force which will put the horse in motion

reaction = force exerted by the road on the horse



F_3 = action exerted by the horse on the road

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