

THE THIRD LAW OF MOTION:

SECTION 6.3

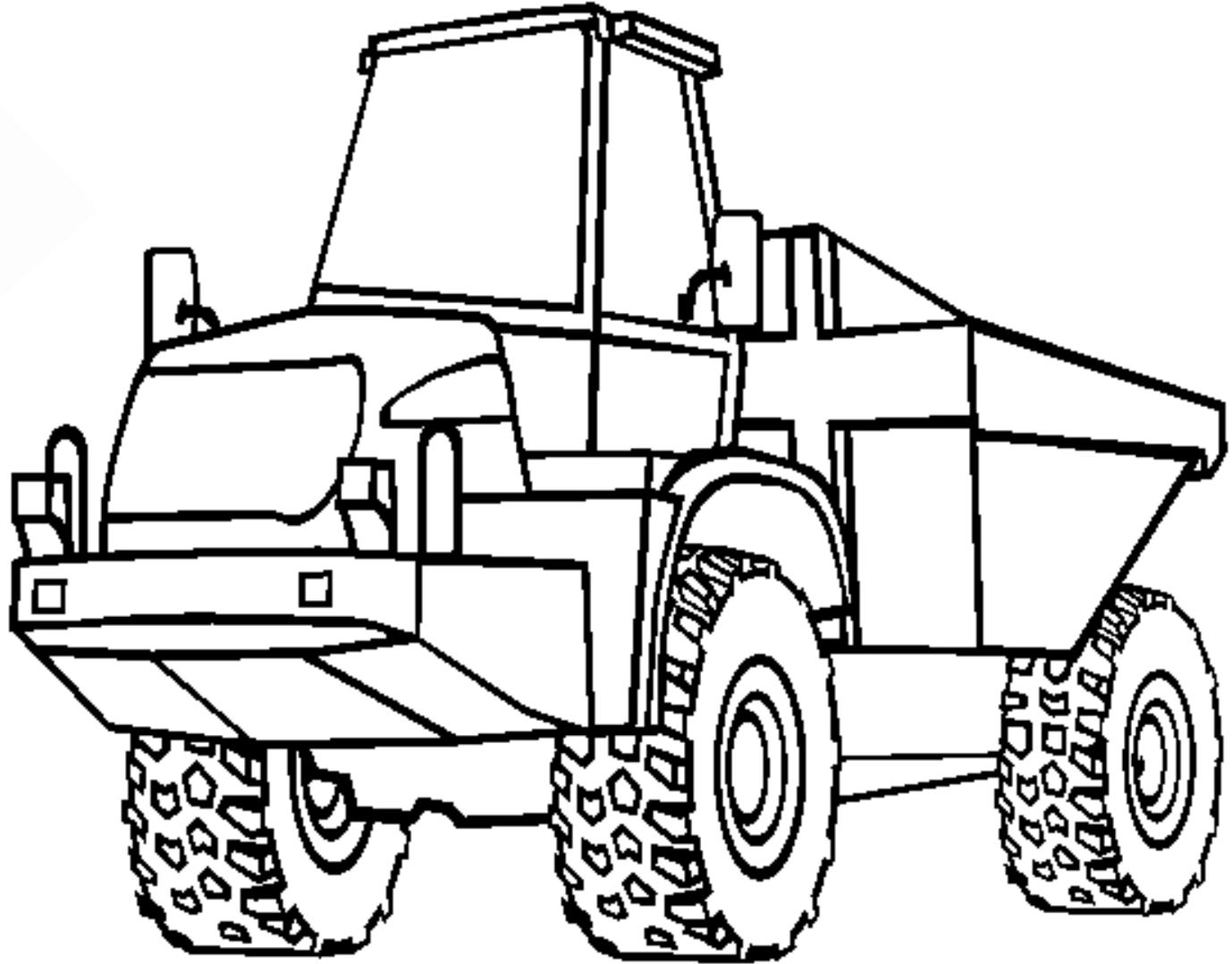
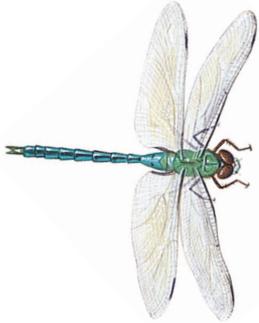
- When one object exerts a force on a second object, the second one exerts a force on the first that is equal and opposite.
- For every action, there is an equal and opposite reaction

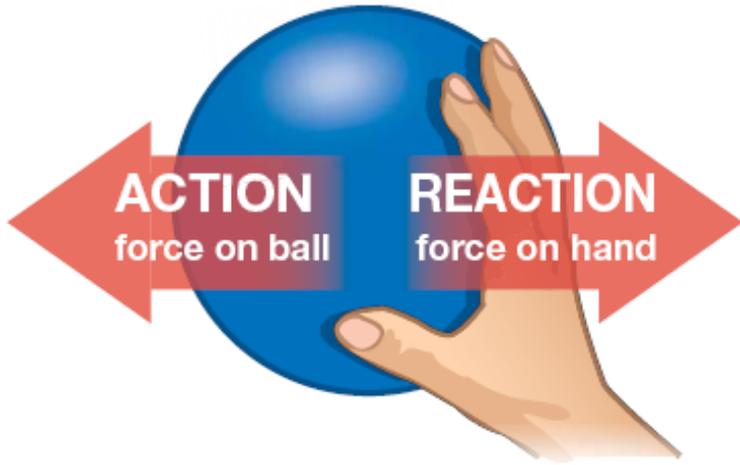


- Forces happen in pairs, it's always an interaction
- Simple rule to identify action/reaction forces:
 - Action: object A exerts force on object B
 - Reaction: object B exerts force on object A
- Example:
 - Action: Your hand pushes down on your desk
 - Reaction: The desk pushes up against your hand.



While the force is always the same, if the objects are different masses, acceleration can be different





One force acts on the ball, and the other force acts on the hand.

- The forces do not cancel because we can only cancel forces acting on the same object.



- The Chapter 6 Reading Packet is due tomorrow
- Bring pop bottle rocket materials on Monday!



Ex: a rifle fires a bullet.

- a. identify the action/reaction forces
 - Rifle pushes on bullet, bullet pushes on rifle

- b. compare the strengths of the 2 forces
 - The forces are equal

- c. compare the acceleration of the bullet and the rifle
 - The bullet will accelerate more

- d. explain the accelerations of the 2 objects
 - $a = F/m$, so given the same force, the object with less mass will accelerate more.

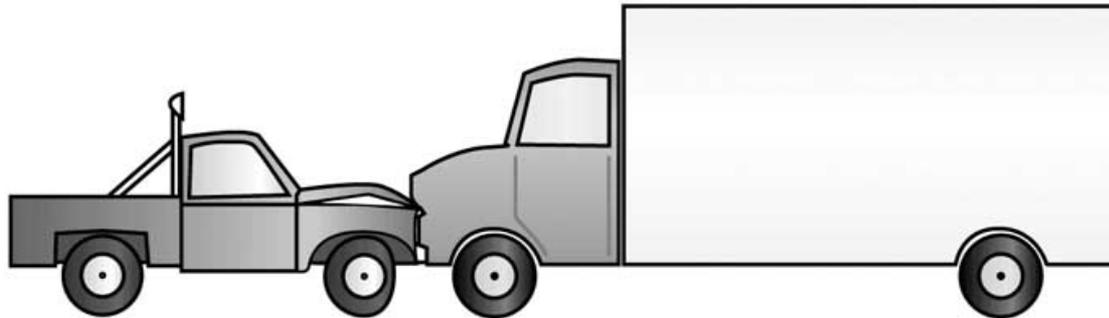
 - Real car = 2000 kg
 - Toy car = 2 kg
 - Real car $a = 1/2000 \text{ m/s}^2$
 - Toy car $a = \frac{1}{2} \text{ m/s}^2$



- The big truck and the small truck collide. The impact force is greater on the

_____.

- Neither – the impact force is the same!



IDENTIFY THE ACTION AND REACTION FORCES



Head bumps ball.

(a) _____

- Action: head bumps ball
- Reaction: ball bumps head





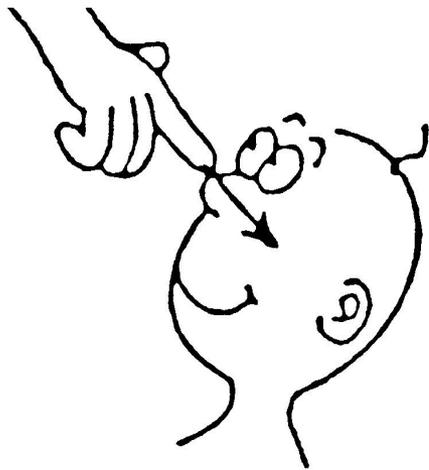
Head bumps ball.

(a) _____

- If the head bumps the ball with 5N of force, how much force does the ball exert on the head?
- 5N
- Which will accelerate more, the ball or the head?
- Ball (because it has less mass)



IDENTIFY THE ACTION AND REACTION FORCES



Hand touches nose.

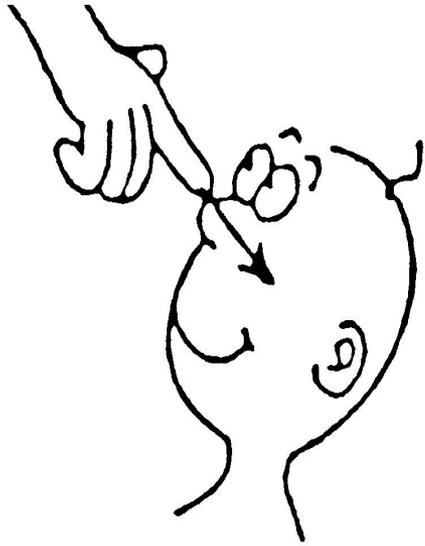
- Action: hand touches nose
- Reaction: nose touches hand

(d) _____



- The big football player and the little football player collide. The impact force is greater on the _____.
- Neither – the impact force is the same!





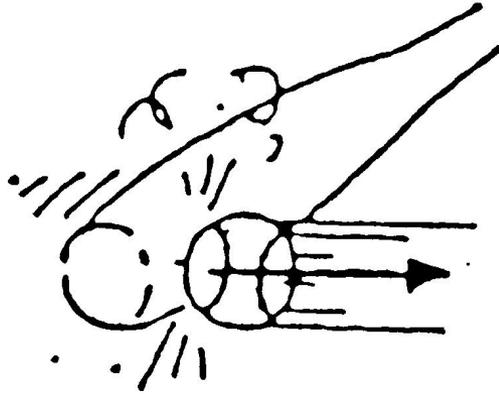
Hand touches nose.

- If the hand touches the nose with 1N of force, how much force does the nose exert on the hand?
- 1N

(d) _____



IDENTIFY THE ACTION AND REACTION FORCES

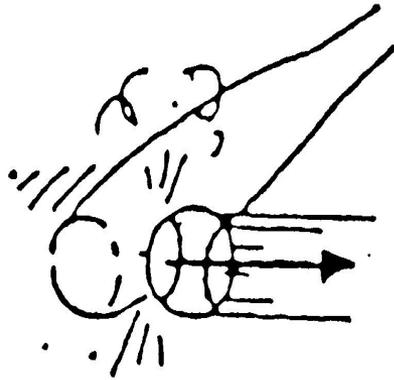


Bat hits ball.

- Action: bat hits ball
- Reaction: ball hits bat

(c) _____





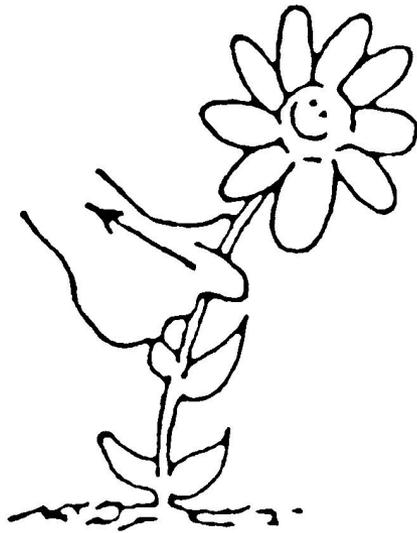
Bat hits ball.

- If the bat hits the ball with 200N of force, how much force does the ball exert on the bat?
- 200N

(c) _____



IDENTIFY THE ACTION AND REACTION FORCES

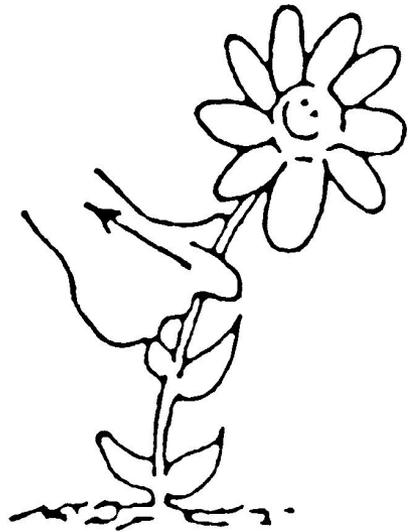


Hand pulls on flower.

- Action: hand pulls on flower
- Reaction: flower pulls on hand

(e)





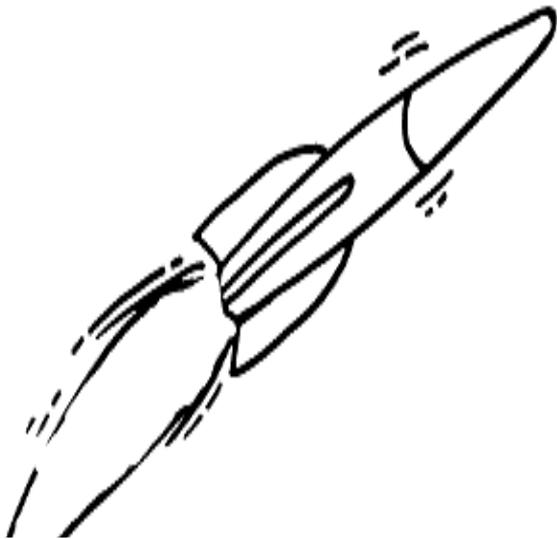
Hand pulls on flower.

(e)

- If the hand pulls on the flower with 7N of force, how much force does the flower exert on the hand?
- 7N



IDENTIFY THE ACTION AND REACTION FORCES



- Action: Rocket pushes on exhaust gas
- Reaction: Exhaust gas pushes on rocket

