## Newton's 2nd Law Practice Problems Name: _____

**F = ma** Date: _____

*Use Newton's second law to solve for force, mass, and acceleration. Give the equation used for each problem and show all work.*

1. What net force is required to accelerate a car at a rate of 2 m/s² if the car has a mass of 3,000 kg?

F = ?
m = 3000 kg
a = 2 m/s²

2. A 10 kg bowling ball would require what force to accelerate down an alleyway at a rate of 3 m/s²?

F = ?
m = 10 kg
a = 3 m/s²

3. Sally has a car that accelerates at 5 m/s². If the car has a mass of 1000 kg, how much force does the car produce?

F=_____
m=_____
a=_____

4. What is the mass of a falling rock if it produces a force of 147 N?

F=_____
m=_____
a=_____

5. What is the mass of a truck if it produces a force of 14,000 N while accelerating at a rate of 5 m/s² ?

F=_____
m=_____
a=_____



## Newton's 2nd Law Practice Problems Name: _____

Date: _____

6. What is the acceleration of softball if it has a mass of 0.5 kg and hits the catcher's glove with a force of 25 N?

F=_____
m=_____
a=_____

7. Your own car has a mass of 2000 kg. If your car produces a force of 5000 N, how fast will it accelerate?

8. Sally challenges you to a race. On the first turn you run off the course and your car strikes a large bale of hay. Your car still produces 5000 N of force, but now it accelerates at only 2 m/s². What is the mass of your car now that the bale of hay is stuck to it?

9. Even though she is way ahead of you, Sally switches her car to run on nitrous oxide fuel. The nitrous oxide allows her car to develop 10,000 N of force. What is Sally's acceleration if her car has a mass of 500 kg?

Newton's 3rd Law Worksheet 2
Physics Name _____ Period_____

Choose the best answer for each question from the choices below. *Be clear about which answer you are circling—none of this trying to circle 2 answers and be sloppy so I'll just count it correct* ☺ And then explain why you have chosen the answer you chose. Good Luck!!!

1. Newton's 3rd Law states…
   a. Objects in motion stay in motion and objects at rest stay at rest
   b. Force is equal to mass times acceleration
   c. For each action there is an equal and opposite reaction

Why???_____

2. An archer shoots an arrow. The action force is the bowstring against the arrow, The reaction force is…
   a. Air resistance against the bow
   b. Arrow's push against the bowstring
   c. Grip of the archer's hand on the bow

Why???_____

3. A player catches a ball. The action force is the impact of the ball against the player's glove. The reaction force is…
   a. The force the glove exerts on the ball
   b. The player's grip on the glove
   c. The friction of the ground on the player's shoes

Why???_____

4. A player hits a ball with a bat. The action force is the impact of the bat against the ball. The reaction force is…
   a. The grip of the player's hands on the ball
   b. The air resistance on the ball
   c. The force of the ball against the bat

Why???_____

5. A baseball player bats a ball with a force of 1,000 N. The ball exerts a reaction force against the bat of…
   a. Less than 1,000 N
   b. More than 1,000 N
   c. 1,000 N

Why???_____

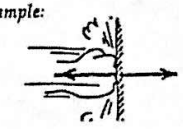
6. A person is attracted toward the center of the Earth by a 500 N gravitational force. The force that the Earth is attracted toward the person is…
   a. 500 N
   b. Much less than 500 N
   c. Much more than 500 N

Why???_____

## Chapter 5 Newton's Third Law of Motion
### *Action and Reaction Pairs*

1. In the example below, the action-reaction pair is shown by the arrows (vectors), and the action-reaction described in words. In (*a*) through (*g*) draw the other arrow (vector) and state the reaction to the given action. Then make up your own example in (*h*).

*Example:*

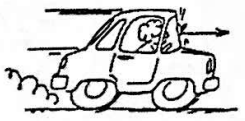


*Fist hits wall.*

*Wall hits fist.*

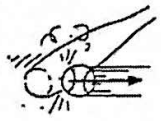
*Head bumps ball.*

(*a*)_____



*Windshield hits bug.*

(*b*)_____



*Bat hits ball.*

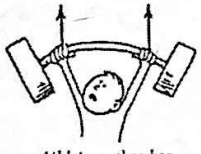
(*c*)_____

*Hand touches nose.*

(*d*)_____

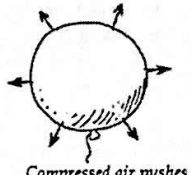
*Hand pulls on flower.*

(*e*)_____



*Athlete pushes bar upward.*

(*f*)_____



*Compressed air pushes balloon surface outward.*

(*g*)_____

(*h*)_____