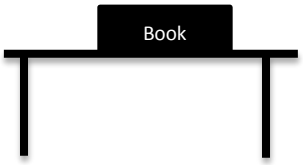
Name: _____ **Chapter 5-1 Worksheet**

1. What is Newton's First Law? _____
_____

2. **OBJECTS AT REST:** ***answer the questions below about objects at rest.***
   a. A book is pictured below sitting on a table. Draw a free body diagram showing the forces acting on the book



   b. What are the net forces acting on the book (balanced or unbalanced)? _____ Explain why: _____ _____
   c. The book is at rest. The book will remain at rest unless a(n) _____ acts upon it.
   d. Taylor pushes the book to the right, but the book does **NOT** move. What two (2) forces should be added to your diagram above? _____ and _____.
   e. What is the action force? _____ What is the reaction force? _____
   f. How big should the action force be compared to the reaction force (bigger, smaller, or same size)?_____
   g. Add these two (2) forces to the diagram above. What is the net force now: balanced or unbalanced? _____ Explain why: _____ _____
   h. Even though the book is being pushed with a force by Taylor what force keeps the book from moving? _____
   i. When the net force on an object is zero the forces are balanced or unbalanced? _____
   j. So…the when the net force acting on the book is zero (balanced) this book will do what: <u>stay at rest forever</u> or <u>move</u>? _____
   k. If a book is pushed with a balanced force does the object move? _____
   l. Is it possible for a book at rest to move if the net force acting on the book is balanced? _____

3. **OBJECTS AT A CONSTANT SPEED:**
   a. A car is traveling at a constant 50 mph to the left. Draw the forces acting on the object below:

   b. What are the net forces (balanced or unbalanced): _____ Explain why: _____ _____
   c. What is the action force? _____ What is the reaction force? _____
   d. How big should the action force be compared to the reaction force (bigger, smaller, or same size)?_____
   e. If the person steps on the gas the _____ force will increase. This will cause a(n) _____ net force. So…the speed will _____
   f. If the person steps on the brake the _____ force will increase. This will cause a(n) _____ net force. So…the speed will _____

g. If the person continues to keep his foot on the gas the same amount then the action force will (increase, decrease, or stay the same) _____, and the friction (reaction) force will _____.

h. If the car is moving and the action force equals the reaction force the car's speed is (speeding up, slowing down, or going a constant speed): _____.

i. If the action force equals the reaction force the net force is _____.

j. So… when the net force acting on the car is zero (balanced) this car will do what: <u>speed up,</u> <u>slow down</u>, or <u>continue to move at a constant speed forever?</u> _____

4. <u>CHANGING DIRECTION:</u>

a. A car is traveling down the road in a straight line at a **constant speed**. The diagram below shows the car from overhead. Draw the two forces (forward and back forces) on the diagram below:

b. Currently, the net force acting on the car is _____.

c. The driver turns the car to the left. He does this by turning the wheel. Is this a force? _____ Why or why not? _____

d. Add this force to the diagram above. What is this action force called? _____

e. Is the net force balanced or unbalanced now? _____

f. So…in order for an object to change direction a(n) _____ net force must act on it.

5. <u>INERTIA</u>

a. A 10 kg box and a 100 kg box are pictured below. Draw the forces acting on the two nonmoving boxes:

b. Which box has more inertia? _____ Explain why using the terms **mass**, **friction**, and **gripping the ground**: _____

_____

c. The two trucks are traveling at a constant 50 mph. They then put the car into neutral and coast. Draw the forces acting on each vehicle below when it is coasting. The vehicle on the right is filled with dirt:

d. Which truck will stop first: heavy or light truck? _____ So…which truck has more inertia: heavy or light truck? _____ Explain why using the terms **mass**, **friction**, and **grip**: _____

_____