

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

## Newton's Laws WebQuest

### Introduction

Explain each of Newton's three laws in your own words:

- A. Law of Inertia <http://www.physicsclassroom.com/class/newtlaws/u2l1a.cfm>

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- B. Law of Force and Acceleration <http://www.physicsclassroom.com/class/newtlaws/u2l3a.cfm>

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- C. Law of Action/Reaction <http://www.physicsclassroom.com/class/newtlaws/u2l4a.cfm>

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1. Part 1 - (<http://www.physicsclassroom.com/mmedia/newtlaws/il.cfm>)
2. Watch the truck and ladder animation. What is another name for Newton's First Law?
3. What do people wear in cars to protect themselves against this law?
4. Investigate and apply Newton's Laws to vehicle restraints.
  - a. Go to <http://regentsprep.org/Regents/physics/phys01/accident/default.htm>
  - b. Choose one of the eight videos and observe Newton's Laws in relation to car crashes.
  - c. Describe 3 ways that Newton's Laws can apply in a car crash.
  
  - d. Compare and contrast the results of a crash while the passengers are **not** wearing seat belts and while they are wearing seat belts.

[http://www.batesville.k12.in.us/physics/phynet/mechanics/newton1/First\\_Law\\_Quiz.html](http://www.batesville.k12.in.us/physics/phynet/mechanics/newton1/First_Law_Quiz.html) Sort through the many questions on this site for clues and answers before you attempt to answer the questions below. Answer the quiz questions and click "why" to learn the reasoning behind the answers

Review what you have learned about Newton's First Law by working through the questions in the chart below.

Question	Answer True or False
If a hockey puck slides on a perfectly frictionless surface, it will eventually slow down because of its inertia.	
Inertia is the property that every material object has that causes objects to resist changes in its state of motion.	
The law of inertia applies to both moving and nonmoving objects.	
The reason a penny thrown straight up inside a bus will come back to your hand is that you, the bus, the air inside the bus, and the penny are all moving at the same velocity.	
An object wants to maintain its state of motion because it has mass.	

Part 2

Watch the presentation and learn about Newton's Second Law

<http://www.wisc-online.com/objects/ViewObject.aspx?ID=TP1302>

1. In what direction does an object move when affected by an unbalanced force?
2. Large force=\_\_\_\_\_.....Small force=\_\_\_\_\_
3. Large Mass=\_\_\_\_\_.....Small Mass=\_\_\_\_\_

Watch the elephant and feather

<http://www.physicsclassroom.com/mmedia/newtlaws/efff.cfm>

Tell how Newton's second law explains why objects of different masses fall at the same rate. (hint: look for information about the ratios discussed in the second law)

See how Newton's Second law applies to [Bumper Cars](#) in this animation.

How many of the scenarios did you get right? \_\_\_\_\_

Review what you have learned by working through these questions:

Question	True or False
Bubba approaches Billie and gives him a swift shove. Timid little Billie keeps his hands in his pocket during this interaction. Subsequently, while Bubba places a force upon Billie, Billie does not place a force upon Bubba.	
Forces always cause objects to move.	
A sled slides down the hill and reaches the bottom where it gradually slows to a stop. Once on the level ground the force of the hill persists upon the sled to allow it to continue its forward motion.	

### Part 3

Read about Newton's [Third Law](#). Use the info here to help answer the questions below.

1. Describe what happens when you fire a gun from the perspective of the 3<sup>rd</sup> Law.
2. Describe what happens when you jump from a small boat onto a dock from the perspective of the 3<sup>rd</sup> Law.

<http://teachertech.rice.edu/Participants/louviere/Newton/law3.html>

1. For every force there is one that is \_\_\_\_\_ in size but \_\_\_\_\_ in direction.
2. In a rocket what creates the initial action?
3. In the rocket what is the equal and opposite reaction?
4. Draw and label the rocket picture

### **Investigate Newton's Laws in the Real World**

I can investigate and apply Newton's Laws to sports activities.

Go to <http://www.exploratorium.edu/baseball/scientificslugger.html> The Scientific Slugger.

e. Read all of the text and fill in the blanks:

The distance a baseball travels depends on \_\_\_\_\_ primary factors: the \_\_\_\_\_ at which the ball leaves the bat, and how \_\_\_\_\_ the ball is hit. The \_\_\_\_\_ of the ball depends on both the speed of the \_\_\_\_\_ and the speed of the \_\_\_\_\_.

Gravity is always pulling \_\_\_\_\_ on the ball. If you hit the ball straight up, it spends quite a bit of time in the air, but doesn't travel far from home plate. If you hit the ball horizontally, as in a line drive, the ball moves away from home plate at maximum velocity, but quickly hits the ground because of \_\_\_\_\_ -- still not very far from home plate. To maximize your hitting \_\_\_\_\_, you need to have both a high horizontal \_\_\_\_\_ AND you need to keep the ball in the air for a \_\_\_\_\_ time. You can do this by hitting the ball at an \_\_\_\_\_ angle.

- ❖ [Newton Biography 1](#)
- ❖ [Newton Biography 2](#)
- ❖ [Newton Biography 3](#)
- ❖ [Newton Biography 4](#)

Meet Sir Issac Newton: Using the biographies below, determine:

1. When was he born?
2. When did he die?
3. Where did he live?
4. What the name of the book was that first introduced his laws of motion?
5. 5 other interesting facts about him
  - a.
  - b.
  - c.
  - d.
  - e.

**On your own paper, illustrate each of Newton's Three Laws**