



The Hobby Shop: Rocket Module

Newton's Laws

Name _____ Date _____ Class _____

Directions: Complete the following questions about model rockets and Newton's laws. You may use the online hobby shop found at www.knowitall.org or other resources to complete the questions.

1. What is Newton's first law?

_____. (10 points)

2. When is a model rocket at rest?

_____. (10 points)

3. What force acts on a model rocket to make it start moving?

_____. (10 points)

4. What force occurs that causes a model rocket to change its direction when it begins descending?

_____. (10 points)

5. What is Newton's second law?

_____. (10 points)

6. You can determine the least amount of force needed to make a model rocket launch. We know the rocket must at least overcome the force of gravity. In order to overcome gravity, the acceleration must be greater than that of gravity's acceleration, which is 9.8 m/s^2 . We will use Newton's second law to determine the least amount of force that could be used just to make the rocket rise off of the launch pad.

Choose a rocket from the table and plug in the amount of your mass in order to determine the least amount of force than can make the rocket rise.

- a. $F > m \bullet a$ (10 points)
 $F \text{ (Newtons)} > \underline{\hspace{2cm}} \text{ kg} \bullet 9.8 \text{ m/s}^2$

Rocket number	Mass
#1	.028 kg
#2	.034 kg
#3	.23 kg

- b. Which rocket did you choose to use in this example?
 _____. (10 points)

- c. What is the least amount of force needed to make your rocket lift off? ____ Newtons (N).
 (10 points)

**This amount of force would only allow the rocket to overcome gravity. The force to launch the rocket to its highest altitude is actually a lot more.

7. What is Newton's third law?

 _____. (10 points)

8. If there is an action force of gases coming out of the bottom of the rocket, which will push against the Earth, what is the resulting reaction force?

 _____. (10 points)