



The Hobby Shop: Rocket Module

Rocket Web Guide

Instructor MASTER

Name _____ Date _____ Class _____

Directions: Open an Internet browser and type www.knowitall.org into the URL box. Once you are at knowitall, click on The Hobby Shop and find your way to the rockets. As you go through the rocket section, complete this guide. You may need to click on the question marks/buttons to help you out; when you are ready to exit a section, click on the X in the upper right corner.

1) After you choose your rocket, you get to customize it. (3 points)

2) What three types of things can you change on your rocket? (3 points)

Nose cone, engine, and fins

Nose cones. Click on the question mark beside the nose cones and answer the following questions.

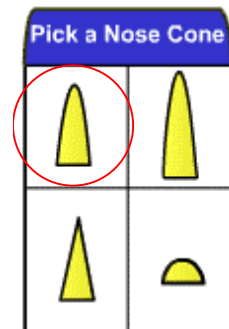
3) Why is the shape of the nose cone important? (5 points)

Its shape contributes to the amount of drag placed on the rocket during flight. The amount of drag on the rocket will help to determine how high the rocket can go. Rockets with high drag values will not be able to go as high as rockets with lower drag values.

4) What is the variable/symbol that represents drag? (3 points)

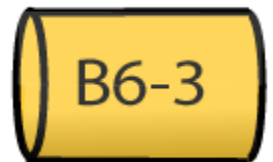
C_d

5) On the chart to the right, circle the nose cone you would use to allow your rocket to reach its maximum height or altitude. (5 points)



Engines. Click on the question mark beside the engines and answer the following questions.

6) The letter B represents the total impulse on this engine. (3 points)



What is the total impulse of this engine? 4.50 Newton-seconds (3 points)

7) What does the total impulse of an engine tell us? (5 points)

The total impulse is the amount of energy an engine contains. Rockets with a higher total impulse will have more energy and will go higher.

8) On the chart to the right:

a. Circle the engine with the lowest total impulse. (5 points)

b. Considering only the total impulse, put a square around the engine that should make a rocket go the highest. (5 points)

Pick Your Engine	
A8-3	B4-4
B6-4	C6-5

9) What does the first *number* on the engine indicate? (3 points)

Average thrust; how fast the energy is released

10) What does the number after the dash on an engine represent? (3 points)

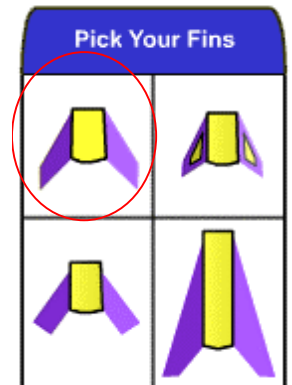
Time delay; the amount of time elapsed between burnout and parachute ejection

Fins. Click on the question mark beside the fins and answer the following questions.

11) What is the purpose of the fins? (5 points)

To create stability during flight

12) On the chart to the right, circle the set of fins you would use to allow your rocket to reach its maximum height or altitude. (5 points)



Newton's first law. Click on the button labeled Newton's first law and answer the following questions.

13) What is the external force applied to launch the rocket? (5 points)

The gas expelling out of the bottom of the rocket pushes against the launch pad and launches the rocket

14) After the engine burns out, what two external forces cause the rocket to change its state of motion? (4 points)

Drag and gravity

Newton's second law. Click on the button labeled Newton's second law and answer the following questions.

15) Use the equation $F = M \times A$ to help you fill in the blanks. The amount of force applied to an object is equal to the object's mass times the object's acceleration. (6 points)

16) What is the number that represents the acceleration of gravity? (Remember to include the units!) (4 points)
9.8 m/s²

17) What is the total mass of this rocket in kilograms? (4 points)
0.0481 kg

18) What is the force of this rocket? (Remember to include the units!) (4 points)
0.47 Newtons

Newton's third law. Click on the button labeled Newton's third law and answer the following questions.

19) For every action, there is an equal and opposite reaction. (4 points)

20) The action of the rocket is the gas expelling from the bottom of the rocket. What is the reaction? (5 points)
The rocket launching

Launch.

21) Launch a rocket. What two things happen to the rocket once it reaches its maximum height? (4 points) A parachute ejects and the rocket falls slowly to the ground

Why would this happen? (4 points) Drag slows the rocket and gravity pulls the rocket back to earth; the parachute is used to soften the rocket's landing.