



## Technology

### Unique Firestreak

# STEP 1

## LEARN (15 minutes)

### Objectives

- Students will discover the specific design features of a model rocket that snaps together.
- Students will construct the Firestreak SST™ model rocket.
- Students will observe the snap together design features by launching their rockets.

### Materials

1. Firestreak SST™ Rocket Lab Pack™ (24 pack) - 1 or more
2. Rocket Engine Lab Pack™ (24 pack) - 1 or more
3. Electron Beam® Launch Controller - 1 or more
4. Porta-Pad® II Launch Pad - 1 or more
5. Pencil and paper for each student
6. Visual/Overhead: Model Rocket Nomenclature

### Time

One class session

### Background

Students will need to understand the parts of a model rocket and their function so they can construct a model rocket and observe the design features unique to the Firestreak SST™ rocket. The main parts of a model rocket are the body tube, engine holder assembly, fins, launch lug, nose cone, shock cord and recovery system. Model rockets are made of lightweight materials like paper, balsa wood and plastic. The body tube is the main structure of the rocket. It determines the main shape of the rocket and is usually long and slender. All other parts are attached to the body tube. The engine holder assembly holds the engine in place inside the rocket. Fins give directional stability and help the rocket fly straight. The launch lug is the hollow tube that slips over the launch

### NATIONAL STANDARD

#### Standard 8

Students will develop an understanding of the attributes of design.

#### Benchmark G

Requirements for a design are made up of criteria and constraints.

Criteria identify the desired elements and features of a product or system and usually relate to their purpose or function.



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rod. The nose cone is attached to the top of the rocket and is tapered to cut through the air more efficiently and reduce drag. The rubber shock cord attaches the nose cone to the body tube so the rocket is recovered in one piece. The recovery system returns the rocket to the ground. The Firestreak SST™ is the first model rocket that snaps together. You do not need standard modeling tools like scissors, glue, hobby knife and paint to make this rocket. Specific design features of the Firestreak SST™ are:

1. It is made entirely of pre-colored, painted plastic with the exception of the white engine tube (spiral wound paper tube). Besides holding the engine, the engine tube serves as the backbone of the rocket.
2. Body Tube Halves A & B - Both have fin slots and a built in engine block (holder) above the fin slots. Body Tube (BT) A has pegs that align with the peg holes on Body Tube B for snapping together. BT-B has built in launch lugs.
3. Fins - There are four fins. The printed fins are attached when the BT halves are snapped together. The unprinted fins fit into the fin slots and are locked in place by sliding them forward.
4. Nose Cone Halves A & B - The tips of both Nose Cone (NC) halves are painted silver. NC-A has pegs that align with the peg holes on NC-B for snapping together.
5. Shock Cord - Made of rubber for its stretch qualities and to avoid burning of the cord.
6. Streamer - Made of plastic for durability. Bright orange color for easy visibility.
7. Engine Cap (2 included) - Fits into engine end of rocket and locks to hold model rocket engine in place.
8. Decal - I-shape design used to decorate and reinforce rocket's body tube seams.

## KEY WORDS

body tube  
engine holder assembly  
fins  
fin slots  
launch lug  
nose cone  
peg holes  
recovery system  
shock cord  
stability

### Activity

1. Discuss why students think rockets are shaped like they are.
2. Students will decide why most rockets are similar in looks.
3. Use an assembled Estes Firestreak SST™ rocket or the Model Rocket Nomenclature visual/overhead to show the main parts of a model rocket and its purpose.



## 2 STEP BUILD (15 minutes)

### Activity

1. Build the Firestreak SST™ together with students, using step-by-step procedures. This is a snap together rocket that needs no gluing or cutting.
2. During rocket construction:
  - Reinforce learning by covering each rocket part and its function.
  - Students will observe and explain the special features of this snap together rocket.

## 3 STEP LAUNCH (30 minutes)

### Activity

1. Assign and post launch jobs for students. Launch jobs are in the *Estes Educator Guide for Teachers & Youth Group Leaders*.
2. Prepare rockets for launching in your classroom before going outside to launch. Follow the Engine Preparation steps located in the Firestreak SST™ Instructions.
2. Launch rockets outside at a soccer field, football field, baseball field, green grass area or blacktop area.

### Wrap Up - Touch Down & Recovery

1. Students will write or discuss the results of their launches by analyzing how the design of the rocket worked.
2. Students will list the special design features of the Firestreak SST™.

### Extensions

1. Students can do a web search to find out who designed the first rocket, how rocket design has changed from the early designs to today's rockets, how modern technology has improved rockets and the uses of rockets.
2. Students will find websites that use technology activities to work with rocketry. For example, RocketModeler 1.2 and RocketModeler II 2.1f at the



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NASA website. Go to [www.nasa.gov](http://www.nasa.gov) and search for RocketModeler.

## Evaluation/Assessment

- Students will discuss or write a summary of the launch results emphasizing specific design features of the Firestreak SST™.
- Students will list the snap together design features of the Firestreak SST™.
- Students will assemble and launch this Estes snap together rocket.

## References

- *Estes Educator™ Guide for Teachers and Youth Group Leaders*
- Estes Educator™ Website - [www.esteseducator.com](http://www.esteseducator.com)