



Technology Snap Rockets

STEP 1

LEARN (15 minutes)

Objectives

- Students will learn the parts of a model rocket and the specific design features of a model rocket that snaps together.
- Students will critique the snap together rocket design features.
- Students will construct and launch the Estes Firestreak SST™ model rocket.

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
7. Model Rocket Nomenclature with blank labels for each student
8. Dragonite™ rocket - 1 (Optional)

Time

One class session

Background

Students will need to understand the parts of a model rocket and their function so they can make their own 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

NATIONAL STANDARD

Standard 8

Students will develop an understanding of the attributes of design.

Benchmark J

The design needs to be continually checked and critiqued, and the ideas of the design must be redefined and improved.



place inside the rocket while the fins give directional stability and help the rocket fly straight. The launch lug is the hollow tube that slips over the launch rod. The nose cone is attached to the top of the rocket and is tapered to cut through the air more efficiently and reduce minimum drag in flight. 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 are inserted 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
decal
drag
durability
engine holder assembly
fins
launch lug
nose cone
recovery system
shock cord
stability
visibility

Activity

1. Make the Estes Firestreak SST™ rocket. Use the visual/overhead Model Rocket Nomenclature and this rocket to demonstrate the main parts of a model rocket and their purpose. Students will fill in the blank Model Rocket Nomenclature worksheet.
2. Inform students that before the Firestreak SST™ was designed, all model



rockets were built by cutting, sanding and gluing all parts together, then painting the entire rocket. This is the first model rocket that is built by snapping it together - no cutting, sanding, gluing and painting. Ask what design features students would use in a snap together rocket.

2 STEP BUILD (15 minutes)

Activity

1. Build the Firestreak SST™ together with students, using step-by-step procedures. This snap together rocket does not require cutting or gluing.
2. While building the rocket, review with students each rocket part, its function and identify 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 inside before going out to launch. Follow the Engine Preparation steps located in the Firestreak SST™ Instructions.
3. 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 design and label a poster about the Firestreak SST™ and its snap together design.
2. Discuss with students how to improve this rocket.
3. Optional: To see how designs are redefined and improved, show students the Dragonite™, the second generation Estes snap together rocket. Compare it to the Firestreak SST™ rocket.



ROCKET LAB™

Extensions

1. Students can compare the snap together rocket construction and launch to the traditional method (glue, etc.) by making and launching an Estes E2X® Skill Level rocket. E2X® Rocket Lab Packs are the Alpha III®, Generic E2X® and UP Aerospace™ SpaceLoft™ rockets.
2. Students will design their own version of a snap together rocket. They can use the Estes Rocket Designer's Plan Sheet to sketch and label their design or use a class computer if CAD software is available. You can download the plan sheet at www.esteseducator.com - PUBLICATIONS.

Evaluation/Assessment

- Students will complete the Model Rocket Nomenclature worksheet.
- Students will successfully build and launch the Firestreak SST™ rocket.
- Students will create a poster about the Firestreak SST™.

References

- *Estes Educator™ - Guide for Teachers and Youth Group Leaders*
- Estes Educator™ Website - www.esteseducator.com