



Technology

Model Rockets are a Snap!

STEP 1

LEARN (15 minutes)

Objectives

- Students will construct a snap together Estes model rocket, the Firestreak SST™.
- While students are building this rocket, they will observe its design features.
- Students will test the snap together design by launching their rockets.

Materials

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

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. For safety, 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. The remaining parts are attached to the body tube. The engine holder assembly holds the engine in place inside the rocket. Fins give directional stability and

NATIONAL STANDARD

Standard 8

Students will develop an understanding of the attributes of design.

Benchmark C

The design process is a purposeful method of planning practical solutions to problems. The process is intuitive and includes such things as creating ideas, putting the ideas on paper, using words and sketches, building models of the design, testing out the design, and evaluating the solution.



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help the rocket fly straight. The launch lug is the hollow tube that slips over the launch rod. The foremost part of the rocket is the nose cone. It is tapered to allow the rocket to have 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 designed to snap 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). In addition to 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 placed into the fin slots and they 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
design
engine holder assembly
fins
launch lug
nose cone
pegs
peg holes
recovery system
shock cord

Activity

1. Discuss with students why they think rockets are designed the way they are. Let students decide why most rockets are similar in looks.
2. Use the Visual/Overhead: Model Rocket Nomenclature to explain the main parts of a model rocket and their purpose.



2 STEP BUILD (15 minutes)

Activity

1. Build the Firestreak SST™ together with students, using step-by-step procedures.
2. While building the rocket, students will observe the special parts and features of the Firestreak SST™ rocket.
3. When rockets are assembled, students will predict what the special parts are and their use. After student predictions, tell them the formal names of the special parts and their purpose. The special parts to emphasize are: engine tube, body tube halves, engine block holder, pegs, peg holes, fin slots, nose cone halves, shock cord, streamer, engine cap and decal.

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 can discuss or write the results of their launches. Things to consider:
 - How did the design of the rocket work?
 - Did the rocket stay together?
 - Did the streamer deploy correctly?
 - Why did some of the rockets launch better than other rockets?
2. Ask students to list the special design features of the Firestreak SST™.



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Extensions

1. Students will list examples of other products, materials, etc. that snap together. Compare the list items with the snap together rocket.
2. Let students design their own model rocket that will snap together.

Evaluation/Assessment

- Students will write a results summary of the Firestreak SST™ launches.
- Students' participation in class discussions.
- Students will make and launch the Firestreak SST™ rocket.

References

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