



A place where you
can take **learning**
to **new heights**.

Inspire your students to imagine the limitless possibilities in aerospace with our line of model rocketry education products.

Choose **Estes Lesson Plans** to Engage Your Students in **STEM**

Develop 21st century skills with your students through lesson plans that promote communication, collaboration, and critical thinking.

Gain confidence in effectively teaching STEM to promote real world learning in the classroom.

Create lifelong memories in your classroom with hands on learning that inspires and ignites creativity. Aerospace careers start with Estes.

Our **Free Lesson Plans** Include:

- A range of topics including STEM, ELA & History
- Assessments
- NGSS and Common Core Standards
- Slide Presentations
- Student Portfolios



Model Rocketry is an **excellent STEM activity** that gets students out of the classroom and into the sky! Students use all the elements of STEM to collect, analyze and communicate data. I've been teaching rocketry for over six years and it's the best activity every year!



Find all of our resources at
edu.estesrockets.com

Get Started

These are the items you need to teach **rocketry** in your classroom:

Rocket Bulk Packs

Engine Bulk Packs

Lifetime Launch System



How to choose the **right** experience for your students:

Age

Younger students (Grades 4-6) need beginner rockets that are simple to assemble. They're not quite ready for the challenge of gluing on individual fins yet, so choose one of our beginner bulk packs. Grades 7-12 are ready for the intermediate rockets!

Time

Consider the amount of time needed to build a rocket, for glue to dry, and how long it will take to prep the rockets before launch. Our snap together rockets are ready to fly in minutes! Our intermediate rockets require a longer glue drying time.

Flying Field Size

The available field size will determine which rocket(s) and engine(s) will be best for your launch. Smaller fields will require smaller engines such as 1/2 A or A. Bigger fields = bigger engines!

A Few Tips

1. **Prepare.** Build a rocket and launch it ahead of time! It's helpful to have that experience before you launch with your students.
2. **Organize.** Get your supplies together and encourage students to keep track of all their rocket parts. Sometimes, there can be many pieces and organization is key!
3. **Be Flexible.** Sometimes lessons don't go according to plan. Have backup activities ready in case things change.
4. **Connect.** STEM and rocketry go hand in hand. Use every opportunity to connect rockets to the science or math concepts you are teaching.
5. **Encourage.** The more excited you are, the more your students will be. Launching rockets is fun and creates memories your students will carry with them forever.



Educator Bulk Packs

**1 hr
OR LESS**

BEGINNER

1764 Generic E2X® Bulk Pack

Length: 13.5 in. (34.3 cm)
Diameter: 0.98 in. (25 mm)
Recovery: Parachute
Recommended Engines:
1/2A6-2, A8-3, A8-5, B4-4,
B6-6, C6-5, C6-7

Pack of 12
MSRP - \$129.99



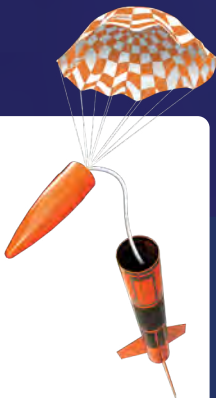
**ONE PIECE
MOLDED FIN UNIT**



1751 Alpha III® Bulk Pack

Length: 12.1 in. (30.7 cm)
Diameter: 0.98 in. (25 mm)
Recovery: Parachute
Recommended Engines:
1/2A6-2, A8-3, A8-5, B4-4,
B6-4, B6-6, C6-5, C6-7

Pack of 12
MSRP - \$144.99



**ONE PIECE
MOLDED FIN UNIT**



1721 Star Hopper™ Bulk Pack

Length: 7.4 in. (18.8 cm)
Diameter: 0.74 in. (19 mm)
Recovery: Streamer
Recommended Engines:
1/2A3-4T, A3-2T, A3-4T,
A10-3T

Pack of 12
MSRP - \$144.99



**PLASTIC SNAP IN FINS:
NO GLUING!**

1749 Gnome™ Bulk Pack

Length: 10.3 in. (26.2 cm)
Diameter: 0.54 in. (14 mm)
Recovery: Streamer
Recommended Engines:
1/4 A3-3T, 1/2A3-2T, 1/2A3-4T,
A3-2T, A3-4T, A3-6T, A10-3T

Pack of 12
MSRP - \$79.99



**ONE PIECE
MOLDED FIN UNIT**

Educator Bulk Packs

2 hrs
OR LESS

INTERMEDIATE



1753 AVG Bulk Pack

Includes 4 of each - Alpha, Viking, and Generic E2X rockets.

Recommended Engines:
1/2A6-2, A8-3, A8-5, B4-4,
B6-4, B6-6, C6-5, C6-7

Pack of 12
MSRP - \$99.99



1754 Wizard™ Bulk Pack

Length: 12 in. (30.5 cm)
Diameter: 0.74 in. (19 mm)
Recommended Engines:
1/2A6-2, A8-3, A8-5, B4-4,
B6-4, B6-6, C6-5, C6-7

Sold Separately:
A10-3T w/ Engine Adapter

Pack of 12
MSRP - \$89.99



INDIVIDUAL FINS THAT GLUE
ONTO THE BODY TUBE

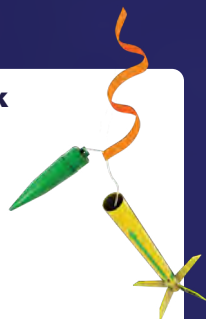


1755 Viking™ Bulk Pack

Length: 12.1 in. (30.7 cm)
Diameter: 0.74 in. (19 mm)
Recommended Engines:
1/2A6-2, A8-3, A8-5, B4-4,
B6-4, B6-6, C6-5, C6-7

Sold Separately:
A10-3T w/ Engine Adapter

Pack of 12
MSRP - \$94.99



INDIVIDUAL FINS THAT GLUE
ONTO THE BODY TUBE

1756 Alpha® Bulk Pack

Length: 12.3 in. (31.2 cm)
Diameter: 0.98 in. (25 mm)
Recovery: Parachute
Recommended Engines:
1/2A6-2, A8-3, A8-5, B4-4,
B6-4, B6-6, C6-5, C6-7

Sold Separately:
A10-3T w/ Engine Adapter

Pack of 12
MSRP - \$144.99



INDIVIDUAL FINS THAT GLUE
ONTO THE BODY TUBE



1718 Green Eggs™ Bulk Pack

An egg lofting rocket designed for the unique needs of teachers. Uses our "mighty" C11 rocket engines to safely lift the extra weight of an egg and keep it well within an average school yard for safe recovery.

Length: 23.6 in. (59.9 cm)
Diameter: 1.8 in. (46 mm)
Recovery: Parachute
Recommended Engines:
w/egg: C11-3, D12-3
w/o egg: C11-5, D12-5

Pack of 12
MSRP - \$219.99



INDIVIDUAL FINS THAT GLUE
ONTO THE BODY TUBE

1706 Orbis 3D™ Bulk Pack

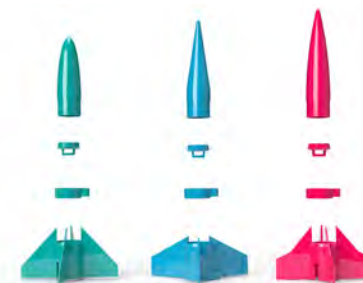
Students 3D print these parts!

This kit comes with body tubes, parachutes and parts you need to build an engine mount. Download .stl files from the Estes website to print your 3D plastic parts to complete your rocket. Nine different design options.

3D printer and filament NOT included

Length: 10 - 12 in. (25.4 - 30.5 cm)
Recovery: Parachute
Recommended Engines: A8-3,
B4-4, B6-4, C6-5

MSRP - \$69.99



Engine Bulk Packs

Every launch requires engines, recovery wadding, starters, and plugs. These convenient engine bulk packs include enough of each for multiple launches. Choose from a variety of engine sizes. We advise using the smallest recommended engines for the first launches. Learn more about how to find the perfect engine on pg. 89.



1788 1/2A3-4T Engines (24); 30 starters; 24 plugs; 72 sheets wadding **MSRP - \$69.99**

1781 A8-3 Engines (24); 30 starters; 24 plugs; 72 sheets wadding **MSRP - \$73.99**

1783 B6-4 Engines (24); 30 starters; 24 plugs; 72 sheets wadding **MSRP - \$89.99**

1784 B6-0 & B6-6 Engines (12 each); 30 starters;
24 plugs; 72 sheets wadding **MSRP - \$89.99**

1789 C6-5 Engines (24); 30 starters; 24 plugs; 72 sheets wadding **MSRP - \$99.99**

1726 C11-3 Engines (12); 20 starters; 16 plugs; 144 sheets wadding **MSRP - \$56.99**

1672 Blast-Off® Flight Pack A8-3, B6-4, C6-3, C6-5 Engines (6 each); 30 starters;
28 plugs; 72 sheets wadding **MSRP - \$79.99**

Accessories

2310 Lifetime Launch System

Designed for teachers and students to withstand the rigors of multiple launches. Stands 18 inches off the ground for easy launch preparation.

- Tilttable launch rod.
- Two-hand safety feature in the launch controller.
- Includes a Pro Series II controller, 30 feet of cable and two different size launch rods

MSRP: \$79.99

The Lifetime Launch System comes with a lifetime warranty available to read at: www.estesrockets.com/lifetime-launch-system-warranty



Includes fully color-coded cutaway for engine component identification.

1207 Phantom™

The Phantom is a STEM education tool and is used in classrooms nationwide!

It demonstrates the various parts of a model rocket to your students!

Length: 12.1 in. (30.7 cm)
Diameter: 0.98 in. (25 mm)
Recovery: Parachute (for demo)
Projected Altitude: Non-Flying Model
Recommended Engines:
Included cutaway engine only.

MSRP - \$21.99



- LCD Display
- Store up to 10 flights
- Battery included.

2246 Altimeter

The Estes Altimeter records heights in one-foot increments up to 10,000 feet (+/- 3 feet). It weighs about 1/2 oz. with a 0.625 diameter. It easily hooks onto the nose cone of your rocket and inserts into the body tube right above the parachute.

MSRP - \$43.99

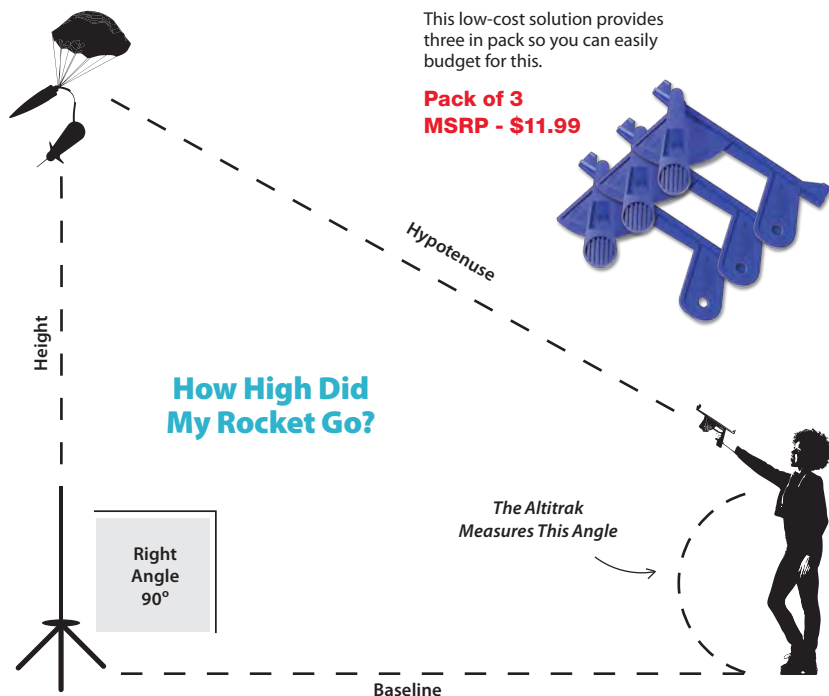


How High Did It Fly?

Part of the fun in launching a model rocket is knowing how high it goes. The Estes AltiTrak is a favorite, easy-to-use rocketry tool that provides fairly accurate measurements of flight altitudes.

The AltiTrak works like a protractor, providing the angle between the baseline and the triangle's hypotenuse (a big math word for the straight line between the person using the AltiTrak and the rocket when it's at peak altitude).

If you measure the baseline as given in the instructions, the AltiTrak also provides your rocket's altitude. The AltiTrak is great for students' science experiments and for teachers' math lessons!



2232 AltiTrak™

Measure altitude with this easy-to-use device. Follow the rocket in the sights to apogee, and release the trigger to lock the reading.

MSRP - \$23.99



2226 Mini AltiTrak™

The mini AltiTrak provides a technology solution for students to track, graph and analyze data.

Their small size makes them easy to transport and share amongst students.

This low-cost solution provides three in pack so you can easily budget for this.

**Pack of 3
MSRP - \$11.99**



Promote Engineering Thinking & Design

The (5326) Rocket Science Starter Set was chosen for the 2019 Purdue University Engineering Gift Guide. Build the rocket and launch it with one of two included options. Observe as a reaction occurs to make the rocket soar! Launch again with the second engine, and measure the difference in altitude with the included altitude tracker.



5326 Rocket Science Starter Set

Length: 12.6 in. (32 cm)
Diameter: 0.98 in. (25 mm)
Recovery: Parachute
Projected Altitude: 1100 ft. (335 m)
Recommended Engines:
1/2 A6-2, A8-3, B4-4, B6-4,
B6-6, C6-5, C6-7

MSRP - \$54.99

Set Includes:

- 1 Rocket
- 1 Porta-Pad II Launch Pad
- 1 Electron Beam Launch Controller
- 1 Parachute
- 1ea. B6-4, C6-5 Engine
- 4 Starters
- 4 Plugs
- 12 Sheets of Recovery Wadding
- 1 Mini AltiTrak Altitude Tracker



ACCESSORIES

Building a model rocket can be as easy as following the instructions - but sometimes you need clean edges, precision alignment, and a flawless finish. For the perfectionist in you, we provide useful jigs, building fixtures, and templates for accurate fin alignment and precision assembly of an Estes model rocket. These tools are made for an expert finish. They make showroom and high-performance modeling look easy.

[illegible]

Product Number: 2303

The StarTech starters stay true to the design of the original, with one key addition. The small nichrome wire, the one that heats the propellant at launch, has been dipped in a specially-crafted chemical compound that reacts with the heat of the wire to create a large burst of heat and pressure that ensures ignition. Never misfire again! Includes 6 starters.

MSRP \$6.99

Shock cords hold the body tube and nose cone of a model rocket together once they separate during the ejection phase. The shock cord is made of an elastic material to help absorb the shock placed upon the rocket when the recovery system ejects, then opens — creating drag during the recovery phase.



Product Number: 2278

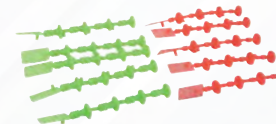
Includes three 1/8 in. x 36 in. (3 mm x 91.4 mm) and one 1/4 in. x 36 in. (6 mm x 91.4 mm) rubber shock cords (enough for four shock cords). Includes shock cord mounts and instructions.

MSRP \$6.99

Product Number: 2250

1/4A3, 1/2A3, A3, and A10 (20 pack)

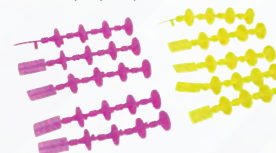
MSRP \$6.99



Product Number: 2251

1/2A6, A8, B4, B6, and C6 (20 pack)

MSRP \$6.99



Product Number: 2252

C11, D12, E9, E12, E16 and F15 (20 pack)

MSRP \$6.99



Model rocket recovery wadding is placed inside the rockets body tube to protect the recovery system from intense heat and gases during the rocket engines ejection stage. All Estes recovery wadding is flame resistant, ensuring the safety of your rockets flight.



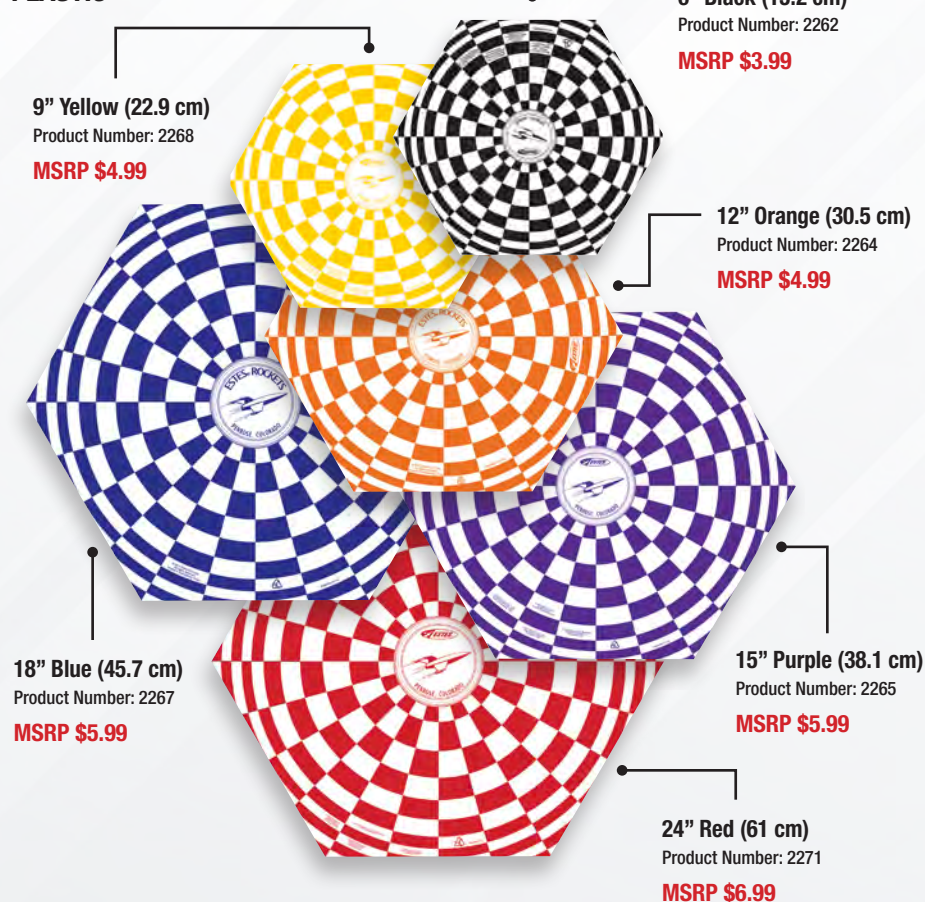
Product Number: 2274

Required in most Estes rockets. Contains approximately 72 squares – enough for about 18-25 flights!

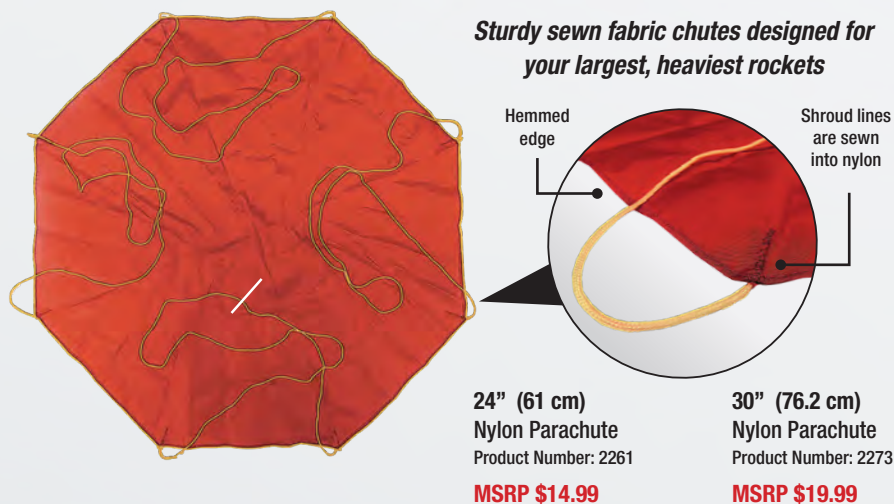
MSRP \$5.99

RECOVERY PARACHUTES

PLASTIC



NYLON



LAUNCH EQUIPMENT

In order to safely and successfully launch your rocket time after time, you'll need the essentials which are a launch base, launch rod, blast plate, and launch controller. Different sized launch bases and launch rods are used to accommodate different sized rockets.

Perfect for beginners and smaller rockets!



Porta-Pad® II & Electron Beam® Launch Controller

Product Number: 2222

Quick assembly - no glue or tools required! Launch rod angle is adjustable. Comes complete with blast deflector, standoff, two-piece 1/8 in. (3 mm) launch rod, and safety cap. Pad can accommodate a 3/16 in. (5 mm) Maxi™ launch rod - not included. Launch controller comes assembled with safety key and 15 ft. (4.6 m) of cable. Requires 4 new 1.5V AA alkaline batteries - not included.

MSRP \$39.99

(Sold Separately)

Porta-Pad® II Launch Pad

Product Number: 2215

MSRP \$24.99

(Sold Separately)

Electron Beam® Launch Controller

Product Number: 2220

MSRP \$29.99



E Launch Controller

Product Number: 2230

Comes assembled with safety key and 30 ft. (9.7 m) of cable. Requires 4 new 1.5V AA alkaline batteries - not included.

MSRP \$35.99

Blast Deflector Plate

Product Number: 2241

Replaces that worn-out deflector. For use with 2215 Porta-Pad® II.

MSRP \$7.99



Two Piece Launch Rod

1/8 in. (3 mm)

Product Number: 2243

Replacement rod ideal for most rockets.

MSRP \$8.99

Two Piece Maxi™ Launch Rod

3/16 in. (5 mm)

Product Number: 2244

Launch rod with extra strength and length for larger rockets.

MSRP \$14.99



Designed for launching larger rockets!

BUILDING TOOLS

Now you can make exact, easy measurements when attending to your fleet of Estes model rockets. Tube marking guides and fin alignment tools help make your hobby rocket endeavors fast, efficient, and fun! These are must-have items for the advanced model rocket enthusiast.



The Tube Marking Guide Allows for Accurate and Consistent Fin Placement When Building Your Rocket.

Ultimate™ Tube Marking Guide

Product Number: 2228

Accurately mark your body tubes for a variety of rocket-assembly purposes!

MSRP \$12.99

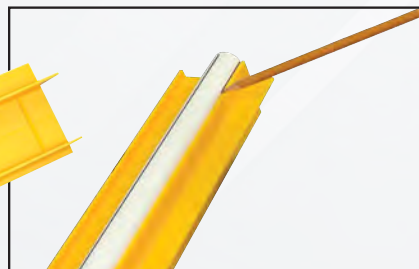


Tube Marking Guide

Product Number: 2227

The tube marking guide is an easy way to mark your fin and launch lug placement. The marking guide is a must for any rocket builder!

MSRP \$13.99



The Ultimate Tube Marking Guide Helps Mark Body Tubes of All Different Sizes.

Never misalign rocket fins again!

Fin Alignment Guide

Product Number: 2231

Fast and accurate fin alignment for three- or four-finned rockets.

MSRP \$23.99

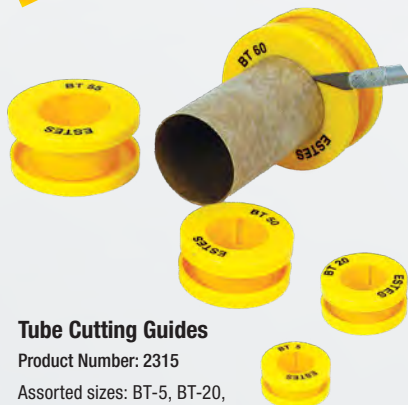


Tube Cutting Guides

Product Number: 2315

Assorted sizes: BT-5, BT-20, BT-50, BT-55, and BT-60 (hobby knife not included).

MSRP \$13.99



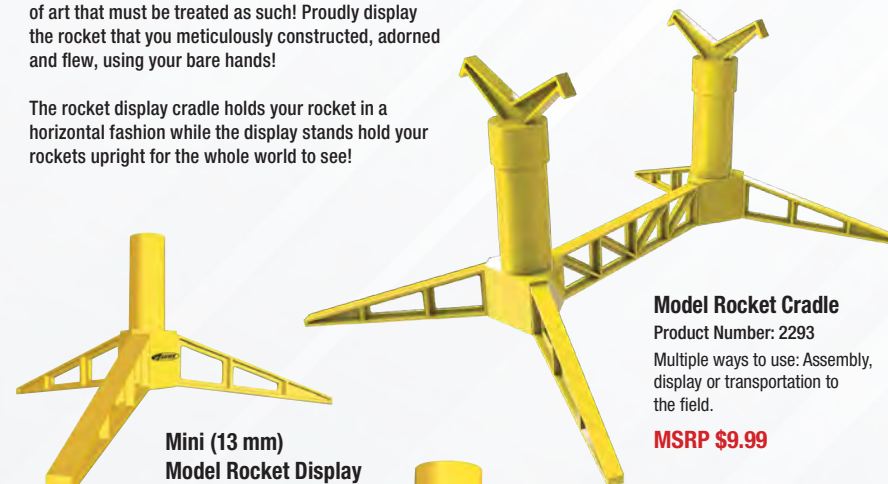
ROCKET DISPLAYS

Proudly display your rockets and craftsmanship with Estes Display Stands and Rocket Cradles!



In the world of model rocketry, models become works of art that must be treated as such! Proudly display the rocket that you meticulously constructed, adorned and flew, using your bare hands!

The rocket display cradle holds your rocket in a horizontal fashion while the display stands hold your rockets upright for the whole world to see!



**Mini (13 mm)
Model Rocket Display
Stand (3)Pack**

Product Number: 2290

MSRP \$8.99

Model Rocket Cradle

Product Number: 2293

Multiple ways to use: Assembly, display or transportation to the field.

MSRP \$9.99

**Standard (18 mm)
Model Rocket Display
Stand (3)Pack**

Product Number: 2291

MSRP \$8.99

**Large (24 mm)
Model Rocket Display
Stand (3)Pack**

Product Number: 2292

MSRP \$8.99



ROCKET PARTS

Model rockets are constructed using various essential parts. Nose cones streamline a rocket's ascent. Nose cone weights help stabilize a rocket's trajectory. Payload sections allow the rocketeer to view their cargo.



Nose Cone Assortment

Each package of nose cones may contain a variety of shapes. Some are one piece, others two piece. All have eyelets for shock cord and shroud line attachments. (3173 shown)

NC-5	Assortment (5)Pack	3160	MSRP \$ 5.99
NC-20	Assortment (4)Pack	3161	MSRP \$ 5.99
NC-50	Assortment (5)Pack	3162	MSRP \$ 9.99
NC-55	Assortment (4)Pack	3163	MSRP \$ 8.99
NC-56	Assortment (4)Pack	3164	MSRP \$ 8.99
NC-60A	Assortment (3)Pack	3165	MSRP \$ 9.99
NC-80B	Assortment (1)Pack	3168	MSRP \$ 4.99
Sci-Fi	Assortment (5)Pack	3173	MSRP \$18.99

Body Tube Packs

High quality spiral wound paper tubes. Use tube couplers to connect tubes of the same diameter. Outer diameters listed. (not all body tube sizes shown)

BT-5	0.54 in./14 mm diameter	• 18 in./45.7 cm long	(4)Pack	3084	MSRP \$ 8.99
BT-20	0.74 in./19 mm diameter	• 18 in./45.7 cm long	(4)Pack	3085	MSRP \$ 8.99
BT-50	0.98 in./25 mm diameter	• 18 in./45.7 cm long	(3)Pack	3086	MSRP \$ 8.99
BT-55	1.33 in./34 mm diameter	• 18 in./45.7 cm long	(3)Pack	3087	MSRP \$ 9.99
BT-60	1.64 in./42 mm diameter	• 18 in./45.7 cm long	(3)Pack	3089	MSRP \$ 9.99
BT-80	2.60 in./66 mm diameter	• 14 in./36.1 cm long	(2)Pack	3090	MSRP \$ 9.99



Payload Section Assortment

(Clear - BT-20, BT-50, BT-60)

Product Number: 3171

MSRP \$19.99



Clay Nose Cone Weights

Product Number: 3180

MSRP \$6.99



Centering Ring Assortment

(BT-5 through BT-50)

Product Number: 3175

MSRP \$7.99

ROCKET PARTS

Engine Hook Accessory Pack

Product Number: 3143

Hooks fit mini engines (x2), regular and D engines (x3), and E12 engines (x2).

MSRP \$5.99



Laser Cut Centering Ring & Shroud Templates (2 ea.)

Product Number: 3179

MSRP \$8.99



Engine Mount Assorted Parts (3 ea.)

Product Number: 3181

Engine mounts for mini-engines, standard engines, and D engines.

MSRP \$8.99



D & E12 Engine Mount Kit

Product Number: 3159

Heavy duty engine mounts for D and E12 engines. Fits BT-55, BT-60, and BT-80 tubes.

MSRP \$11.99

ROCKET PARTS



**29 mm Pro Series II
Engine Retainer Set (2 sets)**

Product Number: 9750

MSRP \$9.99



**24 mm Engine Retainer Set
(2 sets)**

Product Number: 9751

MSRP \$8.99



**18 mm Engine Retainer Set
(2 sets)**

Product Number: 3187

MSRP \$7.99



**Mini (13mm) to Standard (24 mm)
Engine Adapters**

Product Number: 2316

Two simple steps transform a mini-engine into a standard size. Insert a mini-engine into the adapter, and insert the adapter into a rocket. 3 adapters per pack. Reusable. (Engines not included).

MSRP \$6.99



**Standard (18 mm) to Large (24 mm)
Engine Adapters**

Product Number: 2317

Two simple steps transform a standard engine into a 24 mm size. Insert a standard engine into the adapter, and insert the adapter into a rocket. 3 adapters per pack. Reusable. (Engines not included).

MSRP \$6.99

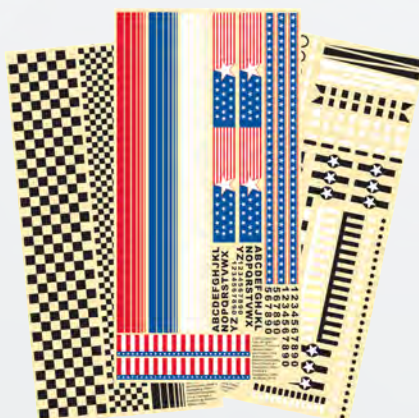


Launch Lug Pack

Product Number: 2320

Contains 4 each: 1/8 in. x 2 3/8 in. (3 mm x 60 mm), 1/8 in. x 1 1/4 in. (3 mm x 32 mm), 3/16 in. x 2 in. (5 x 51 mm) and 1/4 in. x 1 in. (6 mm x 25 mm) launch lugs.

MSRP \$6.99



Waterslide Decal Set

Product Number: 3170

MSRP \$13.99

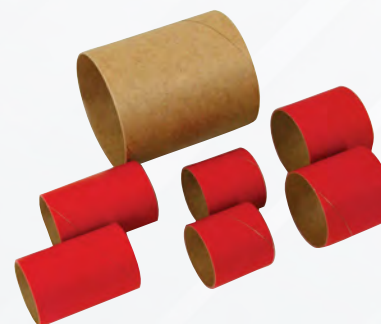
ROCKET PARTS



Tube Couplers (2 ea.) (BT-5, BT-20, BT-50)

Product Number: 3176

MSRP \$4.99



Tube Couplers Assortment Pack

Product Number: 3196

Includes two couplers for BT-55, BT-56, and BT-60; One for BT-80.

MSRP \$7.99



Tube Couplers (2 ea.) (BT-55, BT-60)

Product Number: 3177

MSRP \$5.99



Tube Couplers (2 ea.) (BT-80)

Product Number: 3178

MSRP \$4.99

Standard Engine Mount Kit

Product Number: 3158

Fits BT-50, BT-55, and BT-60 tubes. Can also be used to make a conversion mount for lightweight D powered rockets.

MSRP \$7.99



ULTIMATE SANDING BAR

with Adhesive 120 Grit Sandpaper

NEW

**PERFECT ADDITION
TO ANY
ROCKET WORKSHOP!**



Ultimate Sanding Bar

Product Number: 2318

Size: 2.75" x 7"

Includes: (1) 120 Grit Sandpaper

MSRP \$14.99

Sand Paper

Product Number: 2319

Includes: (2) 220 Grit Sandpaper

(2) 120 Grit Sandpaper

(2) 80 Grit Sandpaper

MSRP \$7.99

DESIGNER'S SPECIAL

Challenge your imagination & take your skills to the next level!



**Contains over 100 parts so you can design
and build the rockets of your dreams!**

Experiment with your own designs. Includes enough parts
to build at least 8 complete rockets. Just add some glue and
your imagination!

Designer's Special™

Product Number: 1980

MSRP \$95.99



Designs shown are for
inspiration only and may
include other imaginative
parts not included in your
Designer's Special.



ENGINES

Our world famous model rocket engines have made model rocketry safe since 1958!

Estes model rocket engines have been proven safe, consistent, and reliable in more than 500 million launches. Thousands of Estes engines are static-tested at the factory for reliability and adherence to performance specifications. All engines comply with the code requirements of the National Fire Protection Association, California Fire Marshal, and are certified by the National Association of Rocketry.

ENGINE CODES

LETTER = TOTAL IMPULSE

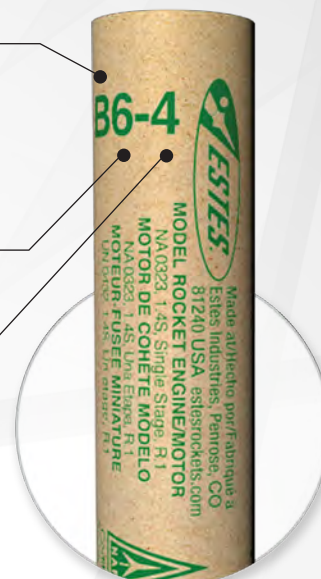
This letter is the total power (in Newton-seconds) produced by the engine. Each succeeding letter has up to twice the total power as the previous letter. (Example: 'B' engines have up to twice the power of 'A' engines, which results in approximately twice the altitude the rocket will reach.)

FIRST NUMBER = AVERAGE THRUST

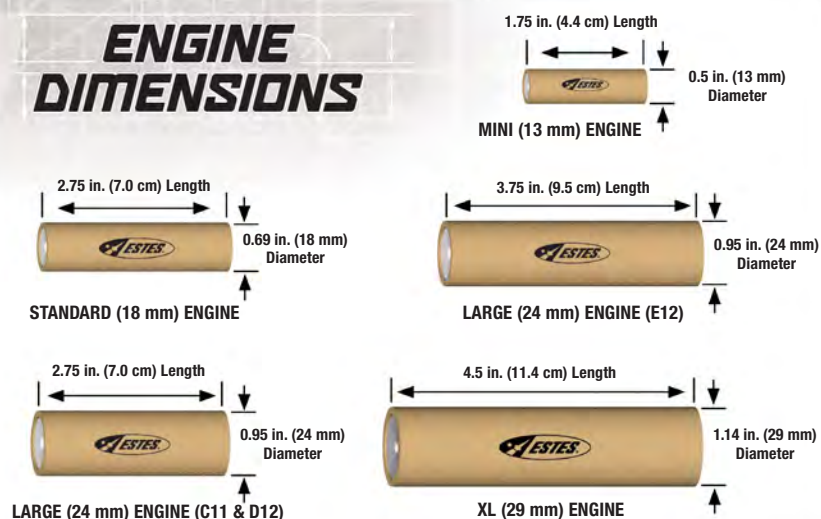
This number shows the engine's average thrust or how fast the engine powers the rocket to go. The higher the number, the faster the speed. It is measured in Newtons (4.45 Newtons = 1 lb.).

SECOND NUMBER = TIME DELAY

This number gives you the time delay in seconds between the end of the thrust phase and the ignition of the ejection charge. Engine types ending in '0' have no time delay or ejection and are used for booster stages and special purposes only. Engines ending in 'P' have no time delay or ejection charge and the forward end is plugged.



ENGINE DIMENSIONS



Each Engine Type is Color Coded

■ Single Stage - Green

■ Upper Stage - Purple

Upper stage engines can be used as single stage engines in lightweight rockets.

■ Booster - Red

Booster engines contain no delay or ejection charge.

■ Plugged - Blue

Plugged engines are used for rocket-powered racers and contain no delay or ejection charge.

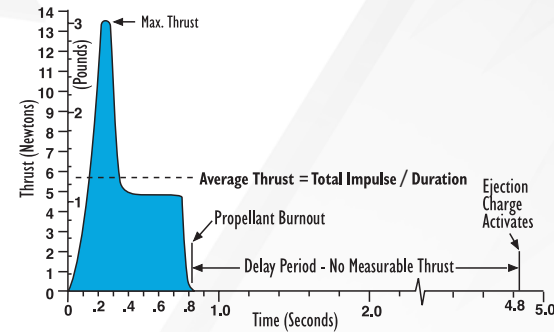


ENGINE TYPES - PERFORMANCE CHART

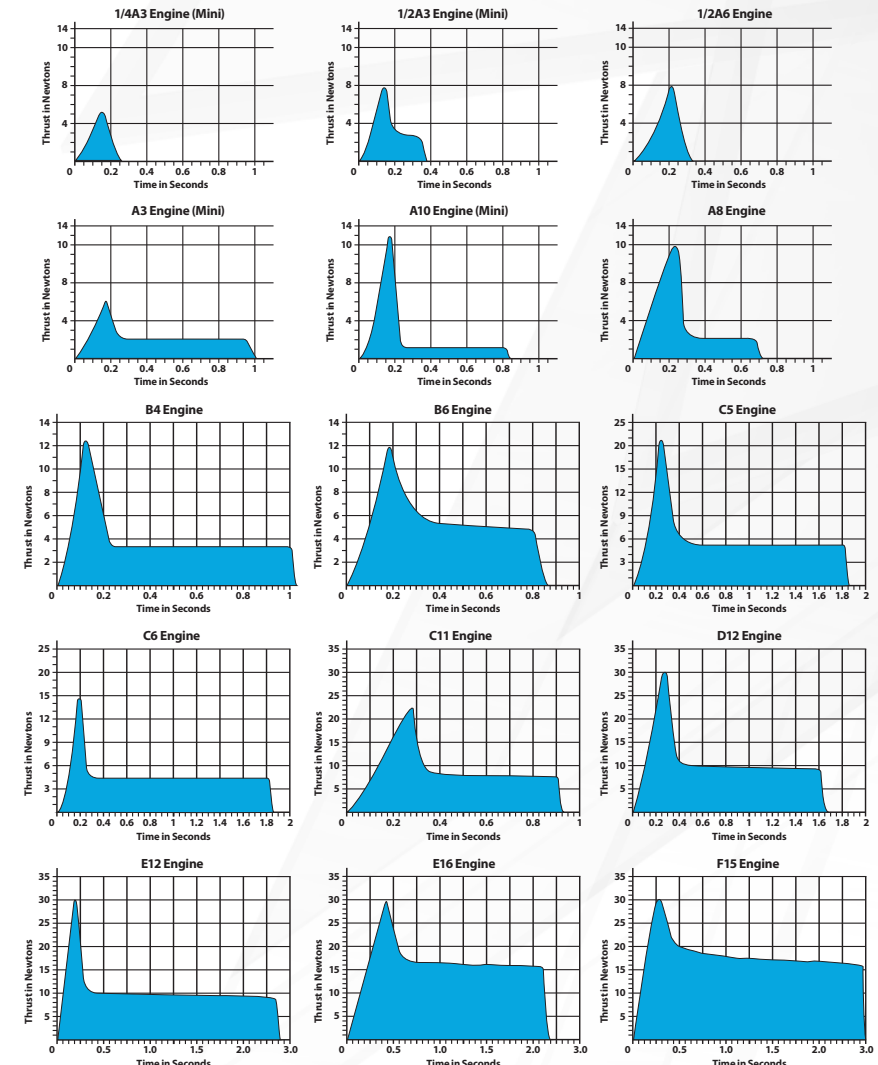
Prod. No.	Engine Type	Total Impulse	Time Delay*	Est Max Lift Wt		Max Thrust		Thrust Duration	Initial Weight		Propellant Weight		Diameter	QTY Per Pack	Retail Price Per Pack
		N-sec	Sec	oz	g	Newtons	Lbs	Sec	oz	g	oz	g	mm		
SINGLE STAGE ENGINES															
1502	1/4A3-3T	0.625	3	1.0	28	4.90	1.1	0.25	0.21	5.9	0.05	1.3	13	4	\$11.29
1503	1/2A3-2T	1.25	2	2.0	57	8.30	1.9	0.30	0.23	6.4	0.07	1.9	13	4	\$11.29
1506	A3-2T	2.50	2	2.0	57	6.80	1.5	0.60	0.25	7.1	0.12	3.3	13	4	\$11.29
1507	A3-4T	2.50	4	2.0	57	6.80	1.5	0.60	0.26	7.4	0.12	3.3	13	4	\$11.29
1508	A3-6T	2.50	6	2.0	57	6.80	1.5	0.60	0.27	7.7	0.12	3.3	13	4	\$11.29
1511	A10-3T	2.50	3	3.0	85	13.00	2.9	0.80	0.29	8.1	0.12	3.5	13	4	\$11.29
1593	1/2A6-2	1.25	2	2.0	57	8.90	2.0	0.30	0.48	13.6	0.10	2.7	18	3	\$11.29
1598	A8-3	2.50	3	3.0	85	10.70	2.4	0.50	0.55	15.5	0.14	4.1	18	3	\$11.29
1601	B4-2	5.00	2	4.0	113	13.20	3.0	1.10	0.66	18.6	0.27	7.6	18	3	\$11.99
1602	B4-4	5.00	4	3.5	99	13.20	3.0	1.10	0.68	19.2	0.27	7.6	18	3	\$11.99
1605	B6-2	5.00	2	4.5	127	12.10	2.7	0.80	0.61	17.3	0.23	6.5	18	3	\$11.99
1606	B6-4	5.00	4	4.0	113	12.10	2.7	0.80	0.63	17.8	0.23	6.5	18	3	\$11.99
1617	C5-3	10.00	3	8.0	227	20.40	4.6	1.85	0.83	23.6	0.39	11	18	3	\$12.99
1613	C6-3	10.00	3	4.0	113	15.30	3.4	1.60	0.83	23.4	0.43	12.2	18	3	\$12.99
1614	C6-5	10.00	5	4.0	113	15.30	3.4	1.60	0.85	24.0	0.43	12.2	18	3	\$12.99
1522	C11-3	10.00	3	6.0	170	22.10	4.9	0.80	1.13	32.1	0.44	12.4	24	2	\$9.99
1523	C11-5	10.00	5	5.0	142	22.10	4.9	0.80	1.18	33.4	0.44	12.4	24	2	\$9.99
1566	D12-3	20.00	3	14.0	396	32.90	7.4	1.60	1.57	44.5	0.85	24.2	24	2	\$13.49
1567	D12-5	20.00	5	10.0	283	32.90	7.4	1.60	1.61	45.7	0.85	24.2	24	2	\$13.49
1692	E12-4	30.00	4	17.0	482	30.60	6.9	2.70	2.16	61.2	1.30	36.9	24	3	\$26.49
1693	E12-6	29.50	6	14.0	397	29.60	6.7	2.70	2.23	63.2	1.30	36.9	29	3	\$26.49
1651	F15-4	49.61	4	21.0	595	25.26	5.7	3.45	3.59	101.5	2.12	60	29	2	\$29.99
1652	F15-6	49.61	6	17.0	482	25.26	5.7	3.45	3.66	103.7	2.21	60	29	2	\$29.99
1696	E16-4	33.68	4	20.0	566	26.44	5.9	2.09	2.86	81.0	1.41	40	29	2	\$25.49
1697	E16-6	33.68	6	16.0	453	26.44	5.9	2.09	2.92	82.7	1.41	40	29	2	\$25.49
UPPER STAGE ENGINES															
1504	1/2A3-4T	1.25	4	1.0	28	8.30	1.9	0.30	0.23	6.6	0.07	1.9	13	4	\$11.29
1599	A8-5	2.50	5	2.0	57	13.30	3.0	0.50	0.55	15.7	0.14	4.1	18	3	\$11.29
1607	B6-6	5.00	6	2.5	71	12.10	2.7	0.80	0.64	18.2	0.23	6.5	18	3	\$11.99
1615	C6-7	10.00	7	2.5	71	15.30	3.4	1.60	0.85	24.3	0.43	12.2	18	3	\$12.99
1524	C11-7	10.00	7	4.0	113	22.10	4.9	0.80	1.19	33.8	0.44	12.4	24	2	\$9.99
1568	D12-7	20.00	7	8.0	226	32.90	7.4	1.60	1.62	46.0	0.85	24.2	24	2	\$13.49
1694	E12-8	29.80	8	12.0	340	31.80	7.1	2.70	2.24	63.5	1.30	36.9	24	3	\$26.49
1653	F15-8	49.61	8	15.0	425	25.26	5.7	3.45	3.69	104.4	2.12	60	29	2	\$29.99
1698	E16-8	33.68	8	14.0	396	26.44	5.9	2.09	2.99	84.7	1.41	40	29	2	\$25.49
BOOSTER STAGE ENGINES															
1510	A10-0T	2.50	NONE	4.0	113	13.00	2.9	0.80	0.24	6.8	0.12	3.5	13	4	\$11.29
1600	A8-0	2.50	NONE	3.0	85	13.30	3.0	0.30	0.47	13.5	0.14	4.1	18	3	\$11.29
1608	B6-0	5.00	NONE	4.0	113	12.10	2.7	0.80	0.55	15.7	0.23	6.5	18	3	\$11.99
1616	C6-0	10.00	NONE	4.0	113	15.30	3.4	1.60	0.76	21.4	0.43	12.2	18	3	\$12.99
1521	C11-0	10.00	NONE	6.0	170	22.10	4.9	0.80	1.03	29.2	0.44	12.4	24	2	\$9.99
1565	D12-0	20.00	NONE	14.0	396	32.90	7.4	1.60	1.43	40.4	0.84	23.8	24	2	\$13.49
1691	E12-0	28.80	NONE	16.0	454	31.30	7.0	2.60	2.05	58.1	1.30	36.9	24	3	\$26.49
1650	F15-0	49.61	NONE	19.0	539	25.26	5.7	3.45	3.32	94.0	2.12	60	29	2	\$29.99
1695	E16-0	33.68	NONE	18.0	509	26.44	5.9	2.09	2.58	73.2	1.41	40	29	2	\$25.49
PLUGGED STAGES - FOR USE WITH ROCKET-POWERED RACERS															
1505	A10-PT	2.50	NONE	3.0	85	13.00	2.9	0.80	0.26	6.83	0.13	3.5	13	4	\$10.29

*Delays have a tolerance of +/- 10% or one second, whichever is greater. The data listed above is from randomly chosen production samples. There are four mini-engines per package. All other engines are two or three per package. NOTE: The 'T' designates a mini-engine. All Estes engines come complete with starters and starter plugs. The Estes starter plug makes engine ignition extremely reliable.

ENGINE TIME / THRUST CURVES



- Time/thrust curves are representative of random production samples.
- Graphs are not drawn to the same scale.



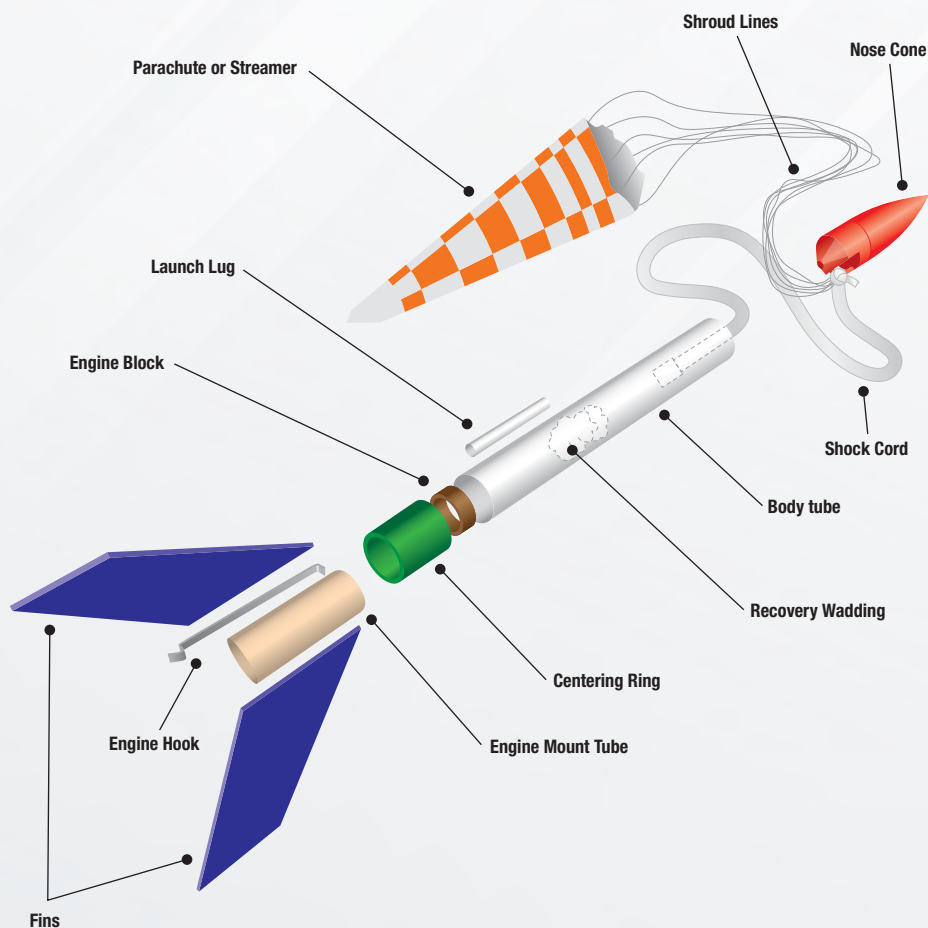
MODEL ROCKET BASICS

What is a Flying Model Rocket?

Estes flying model rockets are safe activity kits designed of lightweight materials such as paper tubing, balsa wood, and plastic. Fins attached to the body tube help provide guidance and stability. An engine mount assembly holds the engine in place during rocket flight in most models.

How Does a Model Rocket Work?

The Estes model rocket is propelled into the air safely by an electrically ignited model rocket engine. After its acceleration, the rocket continues upward emitting tracking smoke as it coasts. At the rocket's peak altitude (also called apogee), a recovery device, such as a parachute or streamer, is deployed to return the rocket gently to earth. The rocket can then be prepared for another flight.



This diagram shows the basic components found in most model rocket kits. Model rocketry is recommended for ages 10 to adult. Adult supervision is suggested for those under 12 years of age.

LAUNCH SITE BASICS

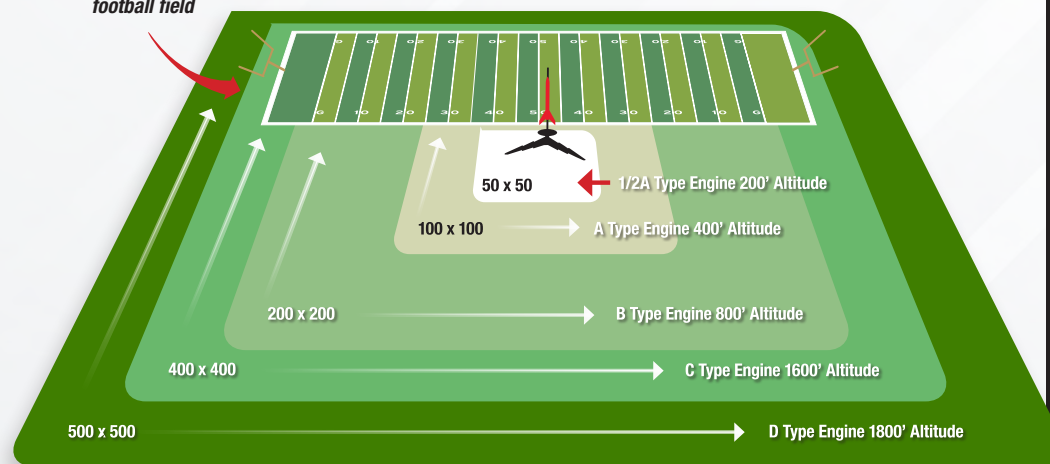
Where to Safely Launch Model Rockets

The chart below tells you what size field to use for each size engine. For launch information, look at the "NAR Model Rocket Safety Code" (Pg. 92). You should always check with your local city government for any special regulations that may apply to your area. Generally speaking, you can fly most Estes model rockets in a clear area the size of a football field or soccer field. Launch in little or no wind, and make sure there is no dry grass close to the launch pad or in the flying field. Each engine size is designated by a letter and is up to twice as powerful as the letter before it. See the engine section (Pgs. 84-87) of this catalog for more information.

LAUNCH SITE DIMENSIONS

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimensions (ft.)
0.00 – 1.25	1/4 A, 1/2 A	50 X 50
1.26 – 2.50	A	100 X 100
2.51 – 5.00	B	200 X 200
5.01 – 10.00	C	400 X 400
10.01 – 20.00	D	500 X 500
20.01 – 40.00	E	1000 X 1000
40.01 – 80.00	F	1000 X 1000

Size of an American football field



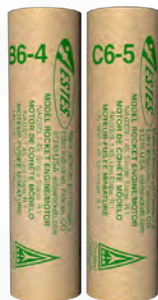
Recommended Launch Site Area

Minimum launch site dimension for circular area is diameter in feet, and for rectangular area is shortest side in feet. Choose a large field away from power lines, buildings, tall trees and low flying aircraft. The larger the launch area, the better your chance of recovering your rocket. Make sure the launch area is free of obstructions, dry weeds, brown grass or highly flammable materials. Football fields, parks and playgrounds are great. Launch only during calm weather with little or no wind and good visibility. The diagram above, shows the smallest recommended launch areas.

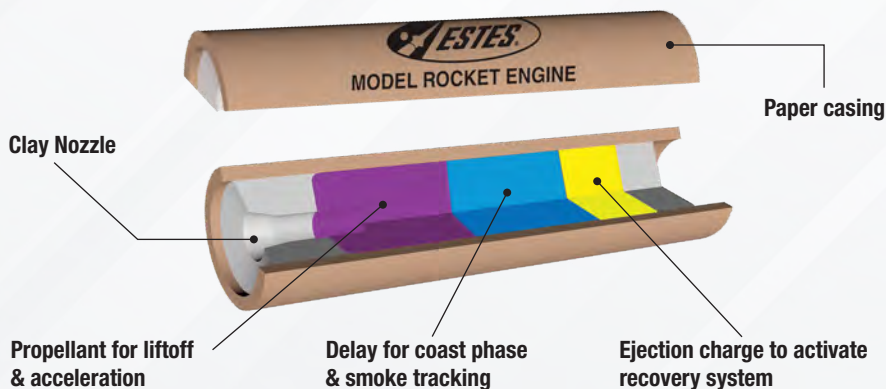
ENGINE BASICS

What is a Model Rocket Engine?

Estes model rocket engines are used to safely launch a model rocket into the air. They are factory-assembled and comply with the safety requirements of the National Association of Rocketry. They are single use and range in power from A to F sizes. The engine is started using an electrical launch system that is powered by alkaline batteries.

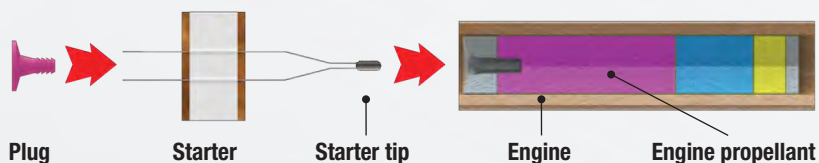


Components of a Model Rocket Engine

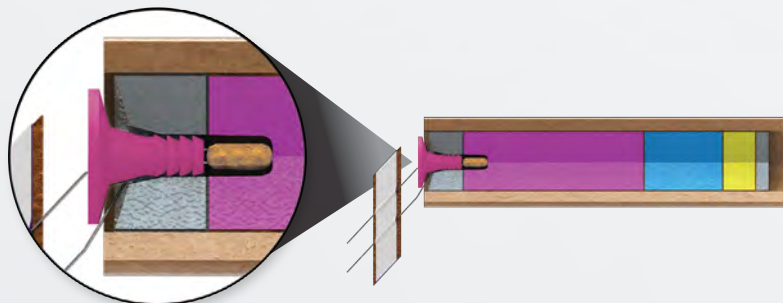


How to Prepare Your Rocket Engine for a Safe Launch

- 1 Use the plug to secure the starter into the engine nozzle of your rocket engine.

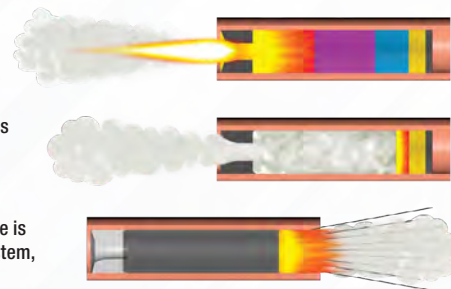


- 2 Make sure the starter is inserted into the engine nozzle and touches the propellant, then insert the plug.

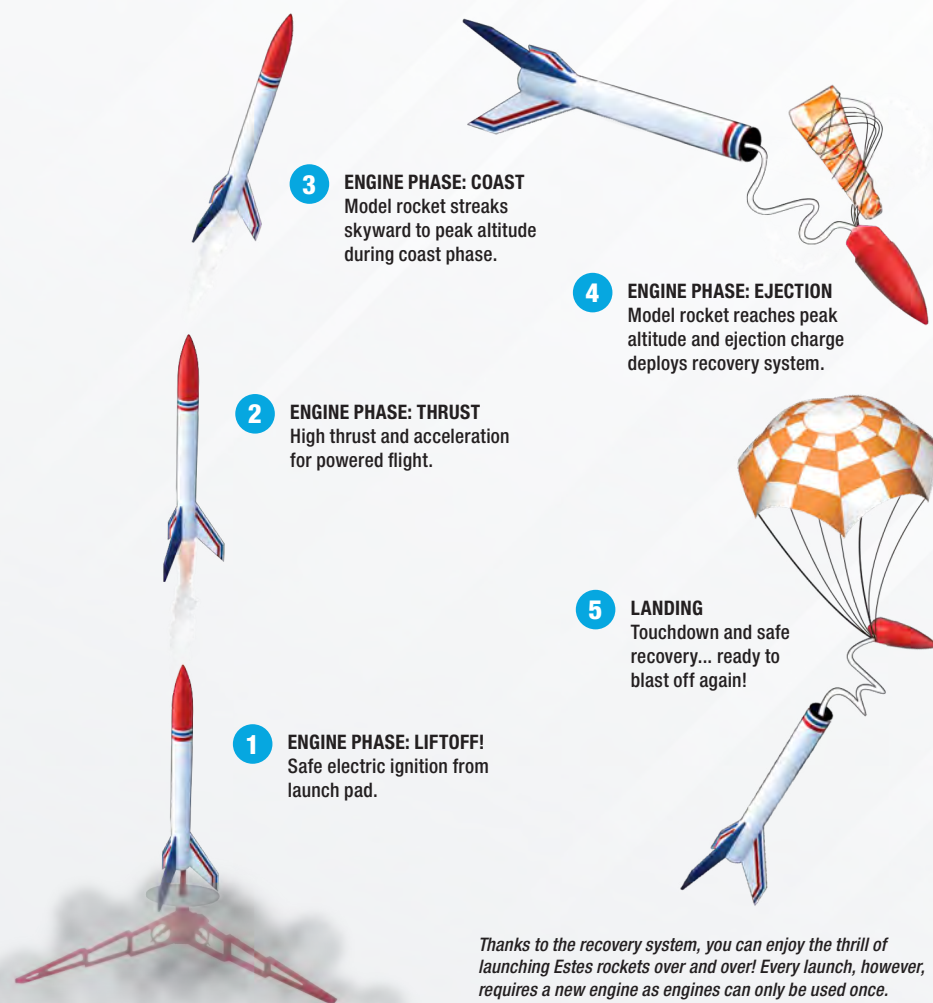


How Does a Model Rocket Engine Work?

- 1 When the engine is started, it produces thrust and boosts the rocket into the sky.
- 2 After the propellant is used up, the delay is activated, producing tracking smoke and allowing the rocket to coast.
- 3 After the delay is used, the ejection charge is activated, which deploys the recovery system, such as a parachute or streamer.



Model Rocket Engine Phase & Flight Sequence



Thanks to the recovery system, you can enjoy the thrill of launching Estes rockets over and over! Every launch, however, requires a new engine as engines can only be used once.



Estes encourages membership in the
NATIONAL ASSOCIATION OF ROCKETRY
<https://www.nar.org>

MODEL ROCKET SAFETY CODE

(Basic Version - Effective August 2012)

1. Materials. I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.

2. Motors. I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.

3. Ignition System. I will launch my rockets with an electrical launch system and electrical motor igniters. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.

4. Misfires. If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock or disconnect its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.

5. Launch Safety. I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with D motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them away to a safe distance. When conducting a simultaneous launch of more than ten rockets I will observe a safe distance of 1.5 times the maximum expected altitude of any launched rocket.

6. Launcher. I will launch my rocket from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or will cap the end of the rod when it is not in use.

7. Size. My model rocket will not weigh more than 1500 grams (53 ounces) at liftoff and will not contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 pound-seconds) of total impulse.

8. Flight Safety. I will not launch my rocket at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload in my rocket.

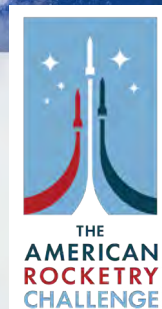
9. Launch Site. I will launch my rocket outdoors, in an open area at least as large as shown in the accompanying table, and in safe weather conditions with wind speeds no greater than 20 miles per hour. I will ensure that there is no dry grass close to the launch pad, and that the launch site does not present risk of grass fires.

LAUNCH SITE DIMENSIONS

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimensions (ft.)
0.00-1.25	1/4A, 1/2A	50
1.26-2.50	A	100
2.51-5.00	B	200
5.01-10.00	C	400
10.01-20.00	D	500
20.01-40.00	E	1000
40.01-80.00	F	1000
80.01-160.00	G	1000
160.01-320.00	Two Gs	1500

10. Recovery System. I will use a recovery system such as a streamer or parachute in my rocket so that it returns safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.

11. Recovery Safety. I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.



ESTES IS A PROUD EDUCATIONAL PARTNER OF THE AMERICAN ROCKETRY CHALLENGE

The American Rocketry Challenge is the world's largest rocket contest with nearly 5,000 students nationwide competing each year. The contest gives middle and high school students the opportunity to design, build and launch model rockets and hands-on experience solving engineering problems.

Visit rocketcontest.org for more information.

GET INVOLVED TODAY!

These organizations and institutions support the development of young people. Like Estes, many of these groups provide unique and valuable learning experiences for students, youth leaders, and education professionals. Together we can inspire and engage students to create lasting memories.



aiaa.org



bgca.org



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nar.org



ymca.net



challenger.org



4-h.org



spacecamp.com



gocivilairpatrol.com



girlscouts.org



scouting.org

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ESTES WARRANTY STATEMENT

Estes model rocket products are warranted against defects in materials or workmanship for one year from the date of the original purchase. If the Estes product, because of a manufacturing mistake, malfunctions or proves to be defective within the one-year warranty period, it will be repaired or replaced, at Estes' option and at no charge to you.

This warranty does not cover incidental or consequential damage to persons or property caused by the use, abuse, misuse, failure to comply with operating instructions or improper storage of the warranted products. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

For repair or replacement under this warranty, please contact us at EstesRockets.com or by mail at Estes Industries, LLC, Customer Service Department, 1295 H Street, Penrose, Colorado 81240-9698. For customer service, call (719) 372-5214.

WARNING: This product can expose you to silica, which is known to the state of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

All Estes model rocket engine packaging carries this warning.

WARNING: Drilling, sawing, sanding or machining wood products can expose you to wood dust, a substance known to the state of California to cause cancer. Avoid inhaling wood dust or use a dust mask or other safeguards for personal protection. For more information go to www.P65Warnings.ca.gov/wood.

Estes Rockets that contain wood parts/components carry this warning.

Prices and availability are subject to change without notice. Color of products may vary.

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PN-2923 (12-22)

PRO SERIES II™

LAUNCHING 2023

9723
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