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APOGEE

PEAK OF FLIGHT

NEWSLETTER

What Does It Take To Get Started In Model Rocketry?

Factors to Consider, Because The Choices Are Immense.

By Tim Van Milligan

This question comes out of my frequently asked questions file. I get many parents and teachers that want to introduce their kids to model rocketry. Since they have never done it before, they all have the logical question, "what does it take?"

To sum things up right here at the beginning, you're going to need a model rocket, a launch pad with an electronic launch controller, and the appropriate rocket engine.

I'll now cover each of these in depth, so you know how to select each of these items.

The Model Rocket

Nearly all manufacturers use some sort of rating system to indicate how easy a model is to assemble. The lower the number, the easier it is to put together. So a Skill Level 1 rocket is going to be easier to assemble than a Skill Level 2 kit. How each "Skill Level" is defined is fairly arbitrary, and left up to the whims of each of the manufacturers. But I've created a Skill Level guide for kits from Apogee Components that you might find helpful. You can find it in Newsletter 31.

My recommendation; if you're just getting started, you should stay away from any kit that is labeled "Skill Level 2" or higher. Even though there are some great looking rockets that you might be tempted to buy, they are going to be harder to assemble. The overall factor to be considered is for the modeler to have a "successful" experience. You don't want them to toss aside the rocket halfway through the building process because it is too hard for them to assemble. You've wasted your money, and turned them off to the exciting hobby of model rocketry.

Start with Skill Level 1 rocket kits. After you've built and flow a Skill Level 1 kit, you'll be ready for something more challenging, like a Skill Level 2 model.

Fortunately, there are many different Skill Level 1 rockets to choose from. Unfortunately, that may make selection a little complicated or confusing. Which one should you buy for the beginner? So let's explore this a bit more.

Selecting which Skill Level 1 model rocket will depend on who is going to be building it. Before you choose a rocket, ask: Is the builder a young child, a middle schooler, or an adult?

The reason I'm asking this question is that we want to know the attention span of the person, as well as the dexterity of their hands in handling modeling tools.

A young child is going to have a shorter attention span than an adult. And, they probably don't know how to use tools properly yet, even something seemingly as simple as drawing a straight line down the length of a body tube with a pencil. It is much harder than you'd think.

You really have to know these qualities of the builder. Why? Because some middle schoolers are very adept at using modeling tools and have a longer attention span than other kids their age.

What is the Purpose of the Rocketry Experience for the Child?

Another variable you have to consider before choosing the rocket kit is the "purpose" of the rocketry experience. For teachers, the purpose might be to teach building skills. Or the teacher may be explaining the forces of flight, and the importance of each individual parts of the rocket.

For a parent selecting a rocket for their son/daughter, the purpose of the rocket might be as a fun toy to play with. They may be looking for something easy that will persuade the kid to drop the video games and go outside and play in the sun-

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shine.

Here are my recommendations for helping you to select the appropriate rocket kit to buy:

● 1. If the child is young, and hasn't any experience working with modeling tools (sandpaper, paint, and especially: hobby knives), then choose a pre-built rocket kit. The pre-built kit is completely assemblsed by the rocket manufacturer. Basically, all the child has to do is shake it out of the box, and shove a rocket motor into the tail and launch it.

You'll find that most "starter outfits" come with completely assembled rockets. No building required. The only thing they may have to do is attach the parachute to the rocket. It just depends on the rocket kit. An example of this is the Quest "Galaxy Series" starter set, which you can purchase online at: http://www.ApogeeRockets.com/starter_sets.asp

Figure 1: The Phaser rocket is good for beginners because it comes completely assembled.

● 2. When the child is young, but the purpose of the launch is more than just for "fun," then you might want to consider a rocket that you have to do more assembly. When this is the case, I recommend a kit that has large parts, and a plastic fin unit. A good example is the Quest Viper, which you can order at: http://www.ApogeeRockets.com/Viper.asp

The plastic fin unit is really helpful for beginners, because it eliminates one of the problems; namely incorrectly attached fins. With a plastic fin unit, you're assured that the fins are straight, and that they won't fall off in flight. This nearly assures that the flight will be straight up and safe.

I suggest the kit have large parts because they are easier to hold and to handle by young kids. That is why toy manufacturers make baby toys with large parts, because they are

Figure 2: A plastic fin unit, like on the Viper speeds up the assembly process.

easier to pick up than toys with small parts.

There are kits out there with plastic fins units, but the model is relatively small. On the surface, these are attractive because they are cheaper than bigger rockets. But if you're buying a kit for a beginner, you should probably shy away from these kits even though you'll save some money. The small parts make assembly more difficult; so there is a greater chance that it might be ruined during assembly or launch. As a minimum, I would recommend that the beginner have a model that is at least 1 inch in diameter. Again, the Quest Viper kit or something similar would be a good choice.

● 3. For teachers in the mid-level grades, it may be desirable that the "building experience" be a major reason for the rocketry unit in the classroom.

In this case, you'll want to choose a rocket where there is more assembly. Namely, gluing balsa wood fins onto the side of the rocket. This takes a little more time, but it teaches a whole lot more than a rocket with a plastic fin unit.

When the modeler has to build the rocket by attaching the fins, you'll see a direct correlation between quality and rocket performance (or lack thereof). A rocket that is properly build will fly higher/faster than one that was quickly slapped together. There is a big difference, and it shows. That is why teachers often tell me that they want their students to actually build the model.

About this Newsletter

You can subscribe "FREE" to receive this e-zine at the Apogee Components web site (www.ApogeeRockets.com), or sending an email to: ezine@apogeerockets.com with "SUBSCRIBE" as the subject line of the message.

Figure 3: The Astra requires more assembly because it has balsa-wood fins.

At this stage, the actual rocket that you select might also take relative "size" into account. A bigger rocket will be easier to assemble than a smaller one; all other things being equal.

In this category, the Quest Astra would be a bigger rocket and slightly easier to put together than the Apogee Blue Streak. But both would be considered "beginner" level rockets.

Regardless of what model you choose, I'd like to make one more recommendation. That is to get a copy of the video book: *"Building Skill Level 1 Model Rocket Kits"* (http://www.apogeerockets.com/skill_level_1_video.asp). Besides just teaching you how to build the model rocket kits, this video book shows you the proper steps on launching the rocket too. That includes information on how to prep the rocket for flight, as well as hooking up the igniter to insure a successful launch the first time you push the launch button.

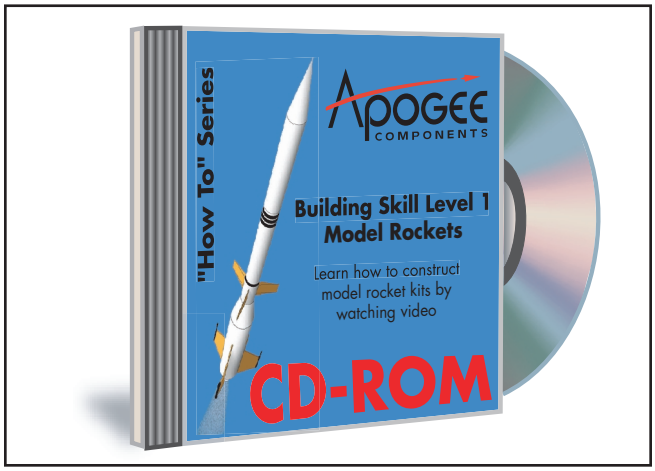

Figure 4: Teaching building techniques is best done visually. This CD contains 70 minutes of "how-to" instructional video.

If you are serious about wanting to choose a good "beginner" rocket, your last consideration should be price. Why? Because the rockets that were really designed for beginners are going to be slightly larger, and therefore a little more expensive than the smaller ones. But you'll be assured of a more pleasant building experience, and then you'll actually spend more time making sure it is put together right -- meaning it will fly better when launched. As I wrote previously, the major factor to consider is making sure the modeler has a "successful" experience. If they have a tough time with it, they'll quickly lose interest in the wonderful hobby of rocketry.

The Rocket Motors

Selecting the appropriate rocket motor to use is far easier to do than picking the first rocket kit. The reason is that the manufacturer of each kit has made a list of recommended rocket motors that work good with the kit.

Most often, the manufacturer will give a choice of at least three motors: smallest, largest, and something in between. They are usually an "A" size, "B" size, and "C" size, with "A" being the smallest, and "C" being the biggest.

As a general rule-of-thumb, going from one size to the next means the rocket will travel twice as high. So a "B" size rocket will go twice as high as an "A" engine. Similarly, a "C"

Figure 5: Quest rocket motors fit most small rocket kits.

size motor will go twice as high as a "B" size motor. Note that if you do the math, a "C" size engine will make the rocket go nearly four times as high as an "A" size engine.

What does this all mean in practical terms? The higher the rocket flies, the greater the chance that you might lose it. It might fly so high that it disappears in the sky, or it might drift in the wind for miles and miles. That isn't going to leave the child with a fun experience if he/she loses the rocket on the first launch.

My recommendation: always choose the smallest size motor that the manufacturer recommends for the particular rocket kit.

From a "successful" flight standpoint, you want the child to retrieve the rocket after the flight. This is particularly important in a classroom or summer camp setting, since the child will want to take the rocket home to show his/her parents the wonderful rocket they built.

Should You Buy Extra Igniters?

When you buy the rocket engines, you might want to buy an extra pack of larger motors. So then after you've successfully flown and retrieved the rocket using the small engines, you can see how high it will go with the bigger ones. In a lot of cases, the kids will get a real kick out of seeing the tremendous altitude they can achieve with a rocket they built with their own two hands. It is a real boost to their self esteem.

The rocket engines come with the igniters to fire them off. You'll read more about this later in the Launch Controller section. I'd recommend buying igniters separately if you are a teacher and are launching more than a dozen rockets. You'll find that it is nice to have a few extra igniters around to use as spares.

One last thing I'd like to point out about the rocket engines. Pay particular attention to the designation recommended by the manufacturer. If the manufacturer recommends a C6-7, that means DON'T USE a C6-3. There is a big difference between the two engines. One will mean a successful flight, and the other will mean failure.

As the buyer for the child, you may not know the difference between a C6-7 and a C6-3 engine. But just be sure you buy the one that the manufacturer recommends. We want to make sure the rocketeer has a successful flight and gets the rocket back so they can fly it again later.

If you decide you want to select a different rocket motor for the kit, you might want to take a look at Apogee Ezine Newsletter 38. It gives you some guidelines for making a good choice.

The Launch Pad

The purpose of the launch pad is to hold and stabilize the rocket during the initial phase of the flight. Why? Because a rocket needs to build up some speed at liftoff, so that the fins can keep the model moving in a straight line.

Figure 6: Quest launch pad.

Don't ever allow anyone to launch a rocket by just setting the rocket on the ground. It is dangerous. As soon as it is lit, you don't know which direction it is going to fly. It could fly right into a crowd of children.

The launch pad has a rod that guides the rocket, and only allows it to travel in the upward direction. By the time it leaves the pad, it has built up enough speed where the fins keep it moving in a straight line.

The pad should also have a wide base, so that it keeps the rocket from tipping over in a breeze.

I've seen many people build their own pads, which is perfectly fine. They usually make them out of wood or some kind of metal. If you want to build your own -- great! Go for it.

If you would rather buy one, you can find a good one on the Apogee Components web site at:

http://www.ApogeeRockets.com/Quest_launch_pad.asp

The Launch Controller

The launch controller is a battery powered device that sends electricity to the rocket igniter to fire off the motor.

Always use launch controller to light the rocket engines. Don't use fuse or wick. With a electrical ignition system, you can control when a rocket will take off. That can't be said with a fuse. Once you lite the fuse, you can't stop it. So if the rocket should accidentally tip over before the motor is ignited by the fuse, it will become a dangerous projectile.

And besides, launch controllers are fairly inexpensive. You can buy a good one from Apogee Components at: http://www.ApogeeRockets.com/Quest_launch_pad.asp

You should note that once you own the launch pad and

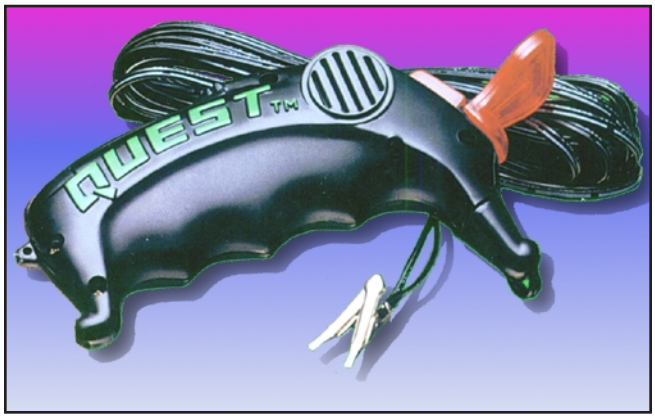

Figure 7: Quest Launch Controller.

controller, you don't need to buy them again for each new rocket. Depending on the size of the rocket, they pad and controller can be used for years and years. If the rocket gets larger than an E-size motor, then you might need a larger launch pad. But the controller can still be used on bigger rockets (up to an F size engine).

Conclusion

This has been a lengthy article describing the separate items you'll need to launch your first rocket. But really it isn't as complicated as it seems. You can buy a starter set that includes everything you need: the rocket kit, the motors, the launch pad and controller. By buying it all together, you'll save money too. I'd recommend the Quest Galaxy Series starter set for most everyone. http://www.ApogeeRockets.com/starter_sets.asp

Once you have a starter set, the only other thing you'd need to buy are the building supplies (if any), and a battery for the launch controller.

It is only when you get into having a need for "build" the rocket and attach the fins as part of the learning experience that you'd probably buy everything separately.

Figure 8: A complete starter set contains everything you need to launch your first rocket.

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