PEAK OF FLIGHT NEWSLETTER

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IN THIS ISSUE

CHOOSING ROCKET KITS FOR YOUNG MODELERS

https://www.apogeerockets.com/Rocket_Kits/Skill_Level_5_Kits/Exa

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APOGEE COMPONENTS

PEAK OF FLIGHT

Choosing Rocket Kits for Young Modelers

By Bobby Potter

Hands down, the most common question we get is: "I want to buy a rocket for my kids/grandkids (etc). What should I get them?"

We know what every rocket is composed of, we know the features and capabilities of each of them, we've even flown them all, and yet this question is difficult to answer. There's just no one item that is going to make everyone happy. People get into rocketry for different reasons, enjoy different parts of the hobby, and they all have different experience levels. A great recommendation for one person would be a nightmare for another.

So - here it is. Our all-encompassing guide to gift giving, recommendations, and anything else for others.

How old are they?

This is the first question we always ask. This gives us a general idea of their capability without knowing anything else. A 5 year old isn't going to be able to handle the things that a 16 year old can, for example. It also helps with picking rocket designs. Older kids may find the beginner rockets boring for example, so we can pick a kit that looks a bit cooler, or is a little more complicated.

What is their level of experience?

The next question we're going to ask you is about the level of experience the modeler has with rocketry. In other words, how challenging of a rocket could they successfully build? We don't want to recommend something (no matter how exciting it may be) if they won't be successful building and flying it.

Evaluating their skill level is really the best place to start. The levels that Apogee uses were determined by Tim himself (and so may differ slightly from skill levels listed by other rocket companies). He selects where each rocket should be placed based on his 30+ years of rocketry experience. For a breakdown of the Skill Levels in more detail, see Peak-of-Flight Newsletter 31: https://www.apogeerockets.com/education/downloads/Newsletter31.pdf

Skill Level 1 - Easy to Construct and Fly

If this is their first rocket ever, regardless of age, you want to start with a Skill Level 1 kit. Skill level 1 rockets will teach you how rockets work, what each part does and the general process of building them, all while being very forgiving.

Some of these kits come with pre-constructed fin sets, meaning you do not need to attach each fin individually. In my opinion, these are better for the classroom setting, where each student is rather unlikely to proceed with the hobby outside of their curriculum. For anyone really looking to get into rocketry, consider making sure your level 1 kit has fins that need to be attached individually. There are key skills developed here, from constructing fin fillets to proper alignment and spacing, and you will need these skills as you advance to higher skill levels.

FIGURE 1: THIRTEEN SKILL LEVEL 1 ROCKETS - THE MAKER'S DOZEN (https://www.apogeerockets.com/Rocket-Kits/Bulk-Rocket-Packs/Makers-Dozen)

Continued on page 3

About this Newsletter

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Choosing Rocket Kits for Young Modelers

Continued from page 2

Skill Level 2 - Previous Experience Recommended

Skill Level 2 kits are a bit more challenging than the first, and if a kit falls into level 2, it's likely because there is a single step in the construction process that requires some more advanced knowledge. This makes level 2 rockets great for learning a diverse set of skills.

Essentially, what this means is that any rocket under level 2 is going to be nearly the same as a level 1 rocket, but with a single additional skill needed to successfully complete. This could be less thorough instructions, an entry into staged rockets like the Sky-Metra or multi-piece fins that need assembled.

Skill Level 3 - Average Skills Needed

A Skill Level 3 kit might require additional skills like the ability to cut body tubes to size, creating uniform fin fillets or complex fins or recovery. You might also need a good understanding of recovery systems as these rockets can often reach a wide range of altitudes, and therefore need different sized parachutes or streamers.

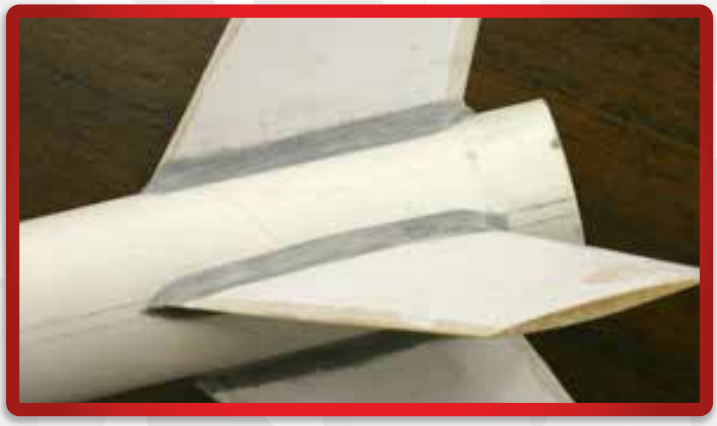

FIGURE 2: CREATING UNIFORM FIN FILLETS

Oftentimes a kit is considered level 3 simply because it requires the use of epoxy. Wood glue, super glue and plastic model cement are typically easier to work with, so any rocket that requires epoxy is going to be considered a level 3 kit, regardless of its complexity. Epoxy comes with some safety issues due to long-term exposure to the chemicals, so we don't recommend that inexperienced modelers use it.

With some level 3 kits, you enter the world of mid-power rocketry, so it is important to understand motor selection and the various launch configurations. You also need to know when not to fly - if it is too windy, for example. A large portion of our rockets fall into this skill level.

Skill Level 4 - Slightly Challenging

Skill Levels 4 and 5 really require someone very experienced in rocketry. Skill Level 4 kits require you to do more complex tasks like cutting tubes at an angle, gluing fins at odd angles or in multiple pieces and use more complicated building materials like fiberglass or vacuum-form wraps.

Continued on page 4

Choosing Rocket Kits for Young Modelers

Continued from page 3

FIGURE 3: THE FLYING MACHINE - A SKILL LEVEL 4 ROCKET (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-4-Model-Rocket-Kits/Flying-Machine)

Skill Level 5 - Extremely Challenging

Anyone building a Skill Level 5 rocket should have a deep understanding of rocket science and build techniques. At this point, they should have enough knowledge and experience to be able to design and build simple rockets entirely from scratch.

At skill level 5 the extreme precision required in some of these kits may also require that the builder understand how to design and create fin jigs and other building fixtures.

Some of the higher skill-level kits only have minimal instructions, even though they may require an extremely complicated construction process. These kits are perfect for the expert rocketeer who wants a long project and has the skills to modify the kit's components to achieve a result that better suits their ideals. For example, a scale modeler may want to add additional details to better match the real rocket they are modeling.

Will someone be helping them with the build?

Especially for young rocketeers, a guiding hand can make a world of difference. Most of us have a mentor, someone in the hobby we look up to and go to for advice. Oftentimes this is a parent, a teacher, or individuals providing guidance to those in skills courses like NARTREK.

Consider who the child is working with on these endeavours. A parent or family friend may need to take it slow just like the child, while other mentors are very capable of teaching the more advanced concepts and can progress with the young rocketeer at a more accelerated rate. If the child has their eyes set on a more advanced project, consider asking the mentor for advice on what would be a good next step. A vast majority of us have been exactly where they are, and the rocketry community makes an excellent resource for those who seek it.

What are they trying to accomplish?

Rocketry is about growth and learning; ask any capable rocketeer and they'll be able to spout off the goals they have, skills they want to learn, and projects they want to complete. A novice rocketeer is hopefully already thinking in this way, but a little guidance never hurts.

Continued on page 5

Choosing Rocket Kits for Young Modelers

Continued from page 4

After determining the child's skill level, talk to them about the topics in rocketry that interests them. Go over the various kits in their skill level and see which kits catch their eye. Do they mention how cool the paint scheme is or are they more focused on the rockets capabilities? Look at some of the kits above their skill level, which ones do they take interest in? What skills are they going to need to learn to be able to complete that more advanced kit?

Asking questions like these will help you get an understanding of what they like and what is drawing them to the hobby. It will also help you understand what they need to learn, and you can gear your kit purchases to those skill sets.

For example, if they have some experience with rocketry, and you know they have their eyes on the Hydra VII (https://www.apogeerockets.com/Rocket_Kits/Skill_Level_4_Kits/Hydra_VII) because they want to launch a bunch of motors - you could get them a kit like the Defender (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-3-Model-Rocket-Kits/Defender), a simpler clustered motor kit. This would teach them many of the skills it takes to cluster motors, setting them up for success when they take on that harder project.

FIGURE 4: THE DEFENDER (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-3-Model-Rocket-Kits/Defender)

Where are they going to fly?

This may seem like it should be an afterthought, but you should always consider this question before purchasing the rocket kit. A rocket capable of reaching a high altitude can easily be lost when flown on a small field. There are also FAA (Federal Aviation Administration) guidelines which need to be adhered to and waivers that need filed for high altitude flights.

Continued on page 6

Choosing Rocket Kits for Young Modelers

Continued from page 5

A safe place to start is the NAR (National Association of Rocketry). The NAR created a guide for the safe use of model rockets called the NAR Safety Code. This code is well known, and is the guiding document for the way our entire community operates. In this safety code, they detail the field sizes required for a safe flight of a rocket at any altitude

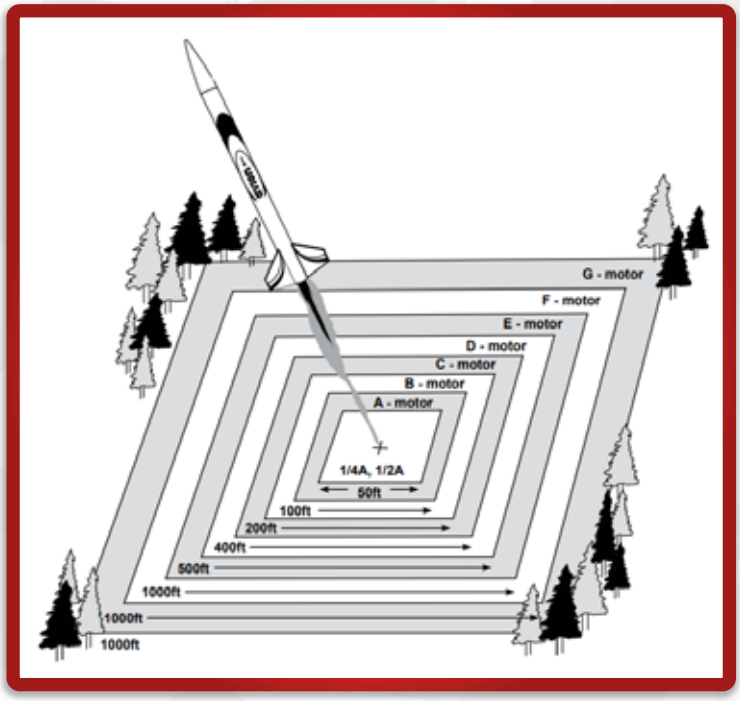

FIGURE 5: MINIMUM FIELD SIZES AS OUTLINED BY THE NAR SAFETY CODE (https://www.nar.org/safety-information/model-rocket-safety-code/)

Rockets designed to go high enough that an FAA waiver might be necessary can still be launched at NAR events, as they file all necessary documentation and provide insurance for all of their launches. However, even at these events, they will limit the altitude of your flight based on field size and the type of waiver they applied for.

How to pick a rocket from the hundreds on our site?

Apogee's website has a little known function, something we often use in-house to narrow our recommendations for any particular individual. You will find our sortable rocket table here: https://www.apogeerockets.com/index.php?main_page=sortable_rockets_list&m=catalog.

On this table you can sort every one of our rockets by skill level, motor sizes, launch pads required, cost or dimensions of the rockets. After setting the parameters that matter to you, it'll give you a nice, clean list of rocket kits that meet your goals.

Determined what they like?

After they have built a few rockets, you might find their interests start to trend toward particular styles. This is pretty typical, people are attracted to different parts of the hobby, and their builds will reflect their interests. I've broken this section into types of rocketeers, so you can best identify who you are buying for. Not every child will fit neatly into one of these categories, but it should make for a good place to start your search.

High Complexity Builders

This individual might particularly like scale models (https://www.apogeerockets.com/Rocket-Kits/Scale-Rockets), those being exact copies of rockets that have been used in space or for missile programs around the world. Typically these builders like intensive builds that

Continued on page 7

Choosing Rocket Kits for Young Modelers

Continued from page 6

require extreme attention to detail.

There are endless scale models, and with RockSim and some know-how you can make a scale model of pretty much any rocket. If you are purchasing a kit for a scale modeler, the premier scale models are 1/70th scale Saturn V (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-5-Model-Rocket-Kits/Saturn-V-1-70th-Scale) and the Saturn 1B (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-5-Model-Rocket-Kits/Saturn-1B-1-70th-Scale). These are some of the highest quality scale models available anywhere, and with a complexity to match.

The Speed Demon

This individual likes going fast. They are all about speed and altitude. To someone outside our hobby, a first reaction would be something big. Big means powerful, right?

Well, yes and no. Big means more powerful motors can fit, but fast and high comes down to a lot of different factors. You'll find that these individuals typically enjoy smaller rockets flown as a minimum diameter rocket, meaning they use a motor the same diameter as the main body tube. A small rocket flown as minimum diameter means maximum power with minimum drag.

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FIGURE 6: THE APOGEE ASPIRE (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-2-Model-Rocket-Kits/Aspire)

Rocket kits like the Apogee Aspire (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-2-Model-Rocket-Kits/Aspire) fit perfectly here. This might seem like a super simple rocket for an expert rocketeer, but an expert rocketeer isn't going to build this thing exactly as directed. They will build their Aspire to house the largest motor possible. They'll likely make different adhesive choices and other small adjustments to make this rocket strong enough to withstand the intense force of high speed rocketry. With these advanced adjustments, this rocket is very capable of exceeding Mach 1, the sound barrier.

Continued on page 8

Choosing Rocket Kits for Young Modelers

Continued from page 7

The Showroom Builder

These rocketeers may or may not attend launches regularly, but what they enjoy most is building a collection of unique, high quality rockets.

It may be best to have a decent understanding of the collection they have already, but similar to the scale builder, the Saturn V and 1B make excellent additions to any display.

FIGURE 7: THE SATURN V 1/70TH SCALE (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-5-Model-Rocket-Kits/Saturn-V-1-70th-Scale)

Showroom builders would also likely enjoy some of the building supplies that really increase the appearance of a finished rocket. I'd recommend things like RocketPoxy (https://www.apogeerockets.com/Building_Supplies/Adhesives/G5000_RocketPoxy_8_oz_Package) or Aluminum Engine Retainers (https://www.apogeerockets.com/Building_Supplies/Motor_Retainers_Hooks).

Some particularly unique rocket kits to add to their collection would be things like the Flying Machine (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-4-Model-Rocket-Kits/Flying-Machine), modeled after a sci-fi steampunk design of an interstellar rocket system.

Capability-Focused Rocketeers

This category is more about what the rocket does, rather than how it may look. For example, cluster-engine rockets, gliders, staged rockets, and helicopter recovery rockets make for a great addition to any collection because they bring a lot of variety to your flights.

Clustered rockets (https://www.apogeerockets.com/Rocket-Kits/Cluster-Rockets) utilize multiple engines on each flight. Some great choices would be rockets like the Defender (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-3-Model-Rocket-Kits/Defender) or Hydra VII (https://www.apogeerockets.com/Rocket_Kits/Skill_Level_4_Kits/Hydra_VII). These appeal to people who like their rockets loud and fast with maximum flames.

Gliders (https://www.apogeerockets.com/Rocket-Kits/Glider-Rockets) and Helicopter (https://www.apogeerockets.com/Rocket-Kits/Helicopter-Rockets) recovery rockets utilize unique recovery systems that eliminate the need for

Continued on page 9

Choosing Rocket Kits for Young Modelers

Continued from page 8

a parachute. Aesthetically they are very different from your typical model rocket, but what makes these desirable is the unique way they return to the ground. Gliders float back to the ground like an aircraft would, utilizing aerodynamic lift to slow the descent. A helicopter recovery uses spinning blades to produce the same lift forces a helicopter would use to slow their descent. Consider the Conder (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-2-Model-Rocket-Kits/Condor-Boost-Glider) or Blue Jay (https://www.apogeerockets.com/Rocket-Kits/Glider-Rockets/Blue-Jay-Boost-Glider) for gliders, and the Heliroc (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-4-Model-Rocket-Kits/Heli-Roc) makes for a great helicopter recovery rocket.

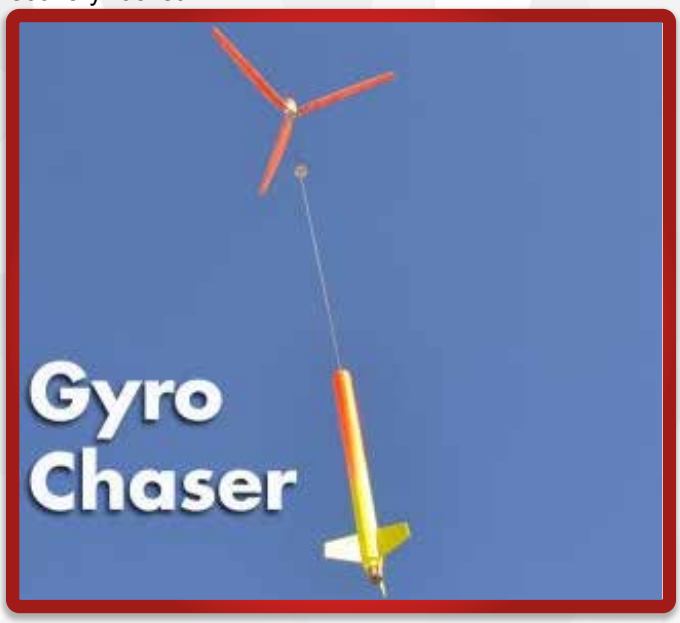

FIGURE 8: HELICOPTER RECOVERY SYSTEM ON THE GYRO CHASER (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-4-Model-Rocket-Kits/Gyro-Chaser)

Staged rockets (https://www.apogeerockets.com/Rocket-Kits/Multi-Staged-Rockets) are exceptionally fun as it is the closest proximity to the rockets we use to reach orbit. Seeing the first stage disconnect while the second stage ignites makes for quite the show. Doubly so with the Hi-Test 3100 (https://www.apogeerockets.com/Rocket_Kits/Skill_Level_5_Kits/Hi-Test_3100), as this is staged and clustered.

In Summary

By knowing who the rocketeer is, what their experience level is and what they are interested in, we can narrow down the massive amount of rocket kits out there into a neat list of recommendations to ensure that the builder has a great experience. We provide many categories and skill level options on our website to assist you when looking for that perfect kit to gift. Should you need assistance beyond what this article gives, we are always happy to take your calls, emails and chats to answer any questions you may have.