OUTREACH

By Dick Freed, Past NAR Section Activities Chairman

"Ask not what your country can do for you... Ask what you can do for your country " John F. Kennedy

It is the purpose of this section to begin to ask ourselves the reason for our existence as a Rocketry Organization. We need to ask ourselves if our purpose is solely self-fulfilling, or if at least a part of our purpose has to do with "doing for others." Ask not what other people can do for your club . . . Ask what your club can do for other people!

I originally got involved with NAR rocketry through the Pittsburgh Space Command. A year later, when the Blastoff Rocket Club of Erie organized, I affiliated with this group also. My experiences with these two groups, along with my work with the late Bob Cannon of Estes forms the body of experience from which I am writing this article.

Reaching out to people in your geographic area serves many purposes.

1. **Good advertising** - FREE. When you do a rocketry activity for a group, your section's name gets out among the public. How many times has someone who lives 10 minutes from your launch area has said, "Gee, I didn't know your group existed!"

2. **Good fellowship -** When a group of rocket people get together to talk rockets, answer questions, share expertise...everyone comes out knowing something new. Think of how a prospective member attending an event might feel.

3. **Role modeling -** Working with children gives them a sense of a new hobby, along with the security that this is a safe hobby they may pursue for years to come. As they see some of the advanced projects they can do, they will be turned on to the hobby. As the children get turned on to rocketry, parents will get involved and this can lead to family memberships in your organization. Remember at any event you are projecting the image of your group and many people will judge the type of group you are by their first impressions.

So . . . where do you look to reach out?

I. The School Connection

At every school there are people interested in the teaching of Science. Many of them already use model rocketry in their school classrooms, or as a club after school. Seek out these people and invite them to join your section. If they are into rocketry, offer to help. If they are not, offer to teach them how! Are the kids interested? You bet! At my school (I teach 5th Grade Science) I had a total of 42 fifth graders who showed up for the fall rocketry program I do as an after-school activity. This represents about 1/5 of the 5th grade population, and this was with no financial backing from the school (the students had to buy their own rockets and launch supplies). The interest is there in any school. All the school needs is its own "rocket man" (or woman).

Once you have a contact in the school, you now will have a way to find out about other science-related activities taking place in the school. One of the Blast-off Club members

found out about a Asuper science@ day at Walnut Creek Middle School, Millcreek Township, Erie, PA. He asked about putting a rocketry presentation into their program, and they were very enthusiastic. The science day takes place on a Saturday morning, with students signing up for 4 - 25 minute sessions during the program. During the sessions, Blastoff members Duane Wilkey, Carl Lindy, and I showed off our rocket collections, discussed how rockets work, and then everyone was invited outside for a launch demonstration at the close of the day. When doing a program like this, especially if it includes a launch, make sure you are launching only tried and tested, goof-proof models. This is not the time to pull that old Estes E-15 out of your launch box. The launch went well, demonstrating a parachute model, a helicopter model, a boost-glider, a two-stage model, and a streamer model. The students and adults alike thoroughly enjoyed the demonstration, and the Blastoff Club gained a few new members as a result of the demo.

Science Fairs are also a great way to set up a display and give kids and adults an opportunity to "talk rockets" with the experts.

For those more into using Science with Rocketry in the classroom, there is the SEP (Student Experimental Payload) Program. My understanding of this program is that students design an experiment in their classroom, and once completed, it is sent to SEP headquarters to be launched at one of the SEP launches in Alabama. George Warren is the chairman of this program, and more information can be found in the "Educational Services" section of the NAR Web Site. Hopefully, I can include more about this program in future revisions of this manual.

II. The Church Camp Connection

Working as a staff member at our church's camp, Camp Lutherlyn, I was first introduced to Model Rocketry. The camp director came up to me during the first week of camp and said, "We're having a model rocketry camp at the end of the summer. I want you to run it." I said, "But I don't know anything about rocketry!" His reply, "See I've given you all summer to learn!" From this humble beginning, during which we built and launched Alpha III rockets all week, the program has grown during its 26 year history to a three-week program, serving campers from 4th through 12th grades. It has, on occasion, even had campers returning after their first year of college. This program has also produced more staff for the camp than any other special program in the camp. It has been my privilege to see many campers grow up to become staff members, and members of Pittsburgh Space Command. At least 4 of the campers in this program have participated in NARAM, and one of the campers from the early years of the program now works at Goddard Space Center in Washington, D.C. He works with shuttle payloads and recently designed the "Inflatable Antenna" for the Spartan Project. This flew in spring 1996. He cites his experiences in rocketry camp as the spark that ignited his interest in space, and eventually his career.

I'm not suggesting that you find someone to run a week or two of camp. (It's very tiring!) But if there are any camps in your area, speak to the director and ask if they would like to have a rocketry demonstration. Pittsburgh Space Command has their July launch on the Sunday that begins the Rocketry weeks at Lutherlyn. The August picnic

for the group is a combination affair that invites all the rocketeers who attended camp to return with their families for a reunion/picnic, and that one last launch of the summer before school starts. These have been well attended, and gives the parents a chance to see what the kids can do, as well as what adults do in rocketry.

Church camps are a natural environment for rocketry as a special interest, and the regular camp programs and rocketry complement each other nicely. Presently, I run three weeks of rocketry at Camp Lutherlyn and another two at Wesley Woods, both Western PA camps. Anyone wanting information on how to implement a Rocketry program in a church camp can order the "Camp Leader's Model Rocketry Manual" which I wrote in 1975 as a guide for starting rocketry programs in camps. This manual is published by Estes, and is available in the Estes catalog, and also is available from NARTS.

III. The Scout Camp Connection

Boy Scouts of America is a natural for model rocketry as one of their Merit Badges is in Space Exploration. The first requirements of this merit badge are to build and successfully launch a model rocket, and then launch it a second time with some kind of mission in mind. This mission does not have to be a complicated one. It can be to simply land a rocket within a specific distance of a flag in the launch area. There are also many knowledge requirements connected with this merit badge, but the rocketry part of it gives the local Section a perfect opportunity for outreach. Scouting groups exist in just about every town and village in the USA. Scout groups are always looking for experienced Merit Badge Counselors to help their scouts earn various merit badges. Members of the Section could start by having a demonstration launch, and follow with a building, launching, and mission launch with the scouts who choose to participate. The knowledge requirements are included in the manual, available from scout headquarters in your area. 4 or 5 sessions with the scouts should be enough to complete the requirements. Who knows? Your time with these kids could help guide them into a space-related career!

In 1989, I participated in the Boy Scout Jamboree, representing Estes Industries at the Merit Badge Midway. During the course of the week, the scouts built 1000 Estes Alpha III kits. After the rockets had a chance to dry, the scouts could launch them twice to cover their build and launch requirement, and then go to the National Space Society booth next door, and have the experts there guide them through the rest of the Merit Badge requirements. Bob Cannon and I ran the rocketry end of things, and G. Harry Stine was on hand at the NSS tent to finish the requirements. What a thrill for the campers to come in contact with Bob Cannon and G. Harry Stine at the same time! I don't know how many merit badges were earned that week, but it must have been a bunch! If a big scouting event is to be held in your area, your section might host a build & launch session. You may be able to get materials donated from local stores, or even from Estes! If not, the scouts themselves can purchase the kits at their local "canteen: and you are in business from there.

Right now, the NAR is investigating a "make it & take it" program to offer sections who might want to participate in activities such as those described above. This has been a

successful event at the Chicago Hobby Show over the last couple years. (How about a write-up on this, guys?)

IV. The Community Connection

Pittsburgh Space Command has run rocketry displays and launches in a number of local community fairs and community day celebrations. At one of those, Mars Community Days, a tent was set up for display and "rocket talk" with 2 demonstrations conducted during the time allotted. Again, as noted above, always use goof-proof designs for demos. This is not the time to try out that scratch-built design you just finished last night. At this demonstration, the town fathers were so grateful they made a $20 donation to the club to defray expenses.

Air shows are a natural place to set up a rocketry display. Because of all of the overhead activity, the air show may or may not allow demonstration launches, but this is a great place to set up a "make it & take it" building area. The Blastoff Rocket Club ran a building session at the Air Show in 1995, building 200 Estes E2X rockets during the Saturday and Sunday event. The following weekend, the builders were invited to attend the regular club launch to launch their rockets for free. Of the 200 kits built, 26 of them returned the following Sunday for our launch. Everyone had a great time, and it resulted in a few new memberships for the club. This event was sponsored by the *World of Science* store of Erie, PA, and *Estes Industries*. It seems the manager of the store was able to get Estes to donate the kits necessary for the event, and the store donated the construction materials needed to put the kits together. If you need supplies to conduct an event of this type, connect with a local store, and propose this nice tax write-off to Estes. The store owner can then set up a small range store, at which hopefully he can sell supplies and equipment to those interested.

Successful Rocketry for Scouting, 4-H, and Other Youth Groups

by Andy Heren, NAR # 71711

Introduction

So, you want to use model rockets with your scout troop or 4-H club? Great idea! Model rocketry can be fun, educational, and exciting. You may have decided to do rocketry with your scouts to earn the Aerospace or Space Exploration badge; or with your 4-Hers to prepare for a county fair entry. You may be doing rocketry just because it is fun. However, there is more to it.

By doing this activity, you may be the catalyst to something BIG. This little venture that you are leading may be what starts a young person on the road to a career in a math or science related field. You may be sparking that interest in a boy or girl who may even become a professional rocket scientist or even an astronaut.

Here are a couple of examples. Watching Sputnik streak through the sky in 1957 led Homer Hickam, Jr., down the road that culminated in his dream of being a NASA engineer. His story can be seen in the movie October Sky, or the book The Rocket Boys. In 1945 a 17-year-old boy from Milwaukee, Wisconsin, built his first rocket. Rockets were also the topic of his term paper at the U.S. Naval Academy at Annapolis. Oh, the name of the young man? James Lovell, Jr. of Apollo 13 fame.

If you are a novice rocketeer or somewhat experienced, you may not quite know where to start. First, be assured that model rocketry is a safe hobby. Second, check out the guidelines below. I have broken your activity down into categories and numbered your steps. The person responsible for organizing each step is listed in parenthesis after the heading. These guidelines cover the key points to organizing a successful launch. Use the "Notes" column to tailor them to suit your schedule needs.

Getting Started (You)

1) Have you ever build, launched, and recovered a model rocket? If not, then that must be your first step! I suggest that you go to your local hobby store or discount store and find a starter set. This set includes a launcher, launch pad, one or two rockets, and enough motors and supplies for two to three launches. Build the rocket, launch it, and get to know how it works.
2) I strongly suggest finding a copy of The Handbook of Model Rocketry by G. Harry Stine. Check your local public library and bookstore. Mr. Stine explains model rocketry in simple terms that aren't overly scientific. He, along with Orville Carlisle, founded the National Association of Rocketry. The Handbook is the official handbook of the NAR. If you only get one book on rocketry, this is the book you need.
3) If you know another adult or a young person who is into rocketry, ask him or her for help. They would probably be glad to help! Even if they're not interested to do it for the whole activity, you can probably get help for at least for part of it.

Preparing for Your Group's Activity (You)

1) Decide which rocket your group will build. I suggest all the kids doing the same rocket.

That way, you can all follow step by step together. Consider these things when choosing your rocket:

(a) What is the age of your group?

(b) Do any of them have prior rocket knowledge?

If your group is mainly 10 and under and/or inexperienced, you should choose one of the easiest to build. Many of these have pre-molded plastic fin units which allow you to skip cutting out, sanding and attaching balsa fins. You should also consider avoiding kits using "mini" motors (13 mm in diameter). They are much tougher to prepare for flight when small children are involved. If your group consists of kids over 10 and they're somewhat coordinated, you could choose a skill level 1 rocket. If any of your kids are experienced, use them to help!

They will love the responsibility of helping you!

2) Select your launch field and get permission to launch. Don't take for granted that it is OK to launch. If launching from a school field, get permission from the principal or school district. If launching in a park, check with your park district, etc. See the NAR Safety Code, Rule #7 to select a field size to insure it is big enough for the size motors you are using.

3) Where will you get the rockets? Some rocket kits are offered to groups in "bulk packs" of 12 kits. If you are ordering for a group that has at least 10 kids, I would suggest the bulk packs as the least expensive alternative. Use your head and be a smart shopper. You have a few choices for shopping locations.

   (1) You can go to your local hobby shop or discount store and see what they have in stock.

   (2) You can order directly from the company from their catalogue.

   (c) You can order from the Internet. A good list of companies is available at Rocketry Online (www.rocketryonline.com), and many of them offer discounts to clubs and groups.

4) How will your group pay for the rockets? That depends on where you purchase them. If you get them from a local store, you could send each child to get his or her own or you could buy them all at once. If you mail order them, you should collect money before you order so you don't have to foot the bill. Will the group's treasury pay for them?

5) Be sure to order one for yourself. It is important for you, the leader, to be sure of what you are doing before you lead your group. Order one of the rockets for yourself and build it ahead of time so that you are familiar with the steps for building this particular rocket.

6) A note on ordering your motors. There are different ones to choose from, but I would suggest getting the recommended "First Flight" motor for your rocket as suggested by the manufacturer. This will ensure that they don't go so high that they disappear. Also, you will be able to see the recovery device deploy. That is pretty exciting! Finally, consider buying "Bulk Packs" of motors as an option. They are less expensive when ordered that way, but may not contain the right motors for your rockets. Check the contents of the pack before you purchase.

7) Order your materials so they arrive at least two weeks ahead of time. This will allow you

ample time to build one of the rockets. It will also give you enough time to be sure you have all the needed supplies. As you order the rockets, be sure you order enough motors, igniters, etc. for all your kids. If they come early, you won't be sweating out the delivery time.

8) Gather all building supplies. Note on the instructions which building supplies you will need for your group. Some possible supplies you will need are a hobby knife, sandpaper, scissors, masking tape, paint, and glue. Make sure you get the proper kinds of glue to use for your particular kit. Glue recommendations are in "Building Your Rockets" below.
9) Think about your meeting place. Is it conducive to rocket building? Are there enough tables and chairs? If not, try to find a larger room to use. Be sure you can clean up after your building is through, too.
10) How much time do you have? You might need to split your rocketry activities into multiple sessions. It's tough to build, paint and fly rockets all in one class session. Splitting things up may make more sense for your group, particularly if they have short attention spans. Make sure you have storage for materials and supplies if you need to split up your rocketry activity sessions.

11) Arrive early and get everything set up before the kids arrive. If you will need more than one night to build the rockets, you may want to consider opening all kits and separating the parts. This way you can distribute the parts as they are needed so that no pieces are lost between meetings. Make sure your storage area is safe and secure, and that all storage containers are labeled properly.

12) Read the NAR Safety Code so you are familiar with it before your group begins their work. A copy of the Safety Code comes with each rocket. Be sure each child gets a copy of this and go over it with the group so they understand the safety rules and promise to follow them. You could even have them sign the bottom showing that they agree to follow all safety rules. This is no time for goofing around!

Building Your Rockets (You, helpers and your kids)

1) Have a lot of extra patience. By now you know that it takes lots of patience to work with children in any setting. Sometimes their excitement and enthusiasm get the best of them and they can be impatient. You may have three asking for help at once. Remember to keep your cool and help whenever they need it. Be positive with them. Show that it is fun for you, too!

2) Go slowly through the directions so that the entire group can keep up. If you have experienced kids in your group, again, enlist their help. Kids love to be helpful. Look for opportunities to let them be.
3) This would be a good time to have other adults there to help. Use parents, older scouts or 4-Hers to help the younger ones.

4) Go through all steps in building and then paint rockets. The rockets come with decals and show how to be painted, but most of the children will want to paint them with their own designs. They may do away with the original design and decals. I have seen some awesome paint jobs. Let them be creative!.

5) Read all instructions first. (Now that's a novel idea!)

6) Use the right kind of glue. When gluing plastic parts to the paper body tube, you will need plastic model cement. When gluing the paper body tube to paper or wood fins, you will need a different type of glue. White school glue is too runny. I learned from G. Harry Stine in his Handbook of Model Rocketry to use Aleen's Original Tacky Glue. It is a thick craft glue that has worked great for me. Other people use regular wood glue, such as Elmer's or Titebond. Either of these types would be an excellent choice. They dry clear and can be painted. We don't recommend either epoxy or instant (cyanoacrylic, or CA) glues. Epoxies required mixing, take time to cure, and are messy and expensive. CA can harm sensitive body tissue, particularly eyes, and result in brittle, easy to break joints.

7) Sand balsa fins properly. When sanding balsa fins, sand the leading edge of the fin to round it into an airfoil shape. This makes it a little more aerodynamic (and it looks better, too).

8) Make the fin joints strong with two simple tricks. After marking the body tube, punch small holes along the line where your fin will be glued on. This creates a rivet-like joint and a very strong attachment. Then rub a thin film of glue onto the root edge of fin. Allow it set a minute or two to become tacky. Apply a second thin film of glue to the root edge of fin. Gently press the root edge along the body tube fin line. Adjust the fin, if needed, so it will project straight from the body tube. Work slowly and carefully so as not to disturb the glue joint.

9) Check your fin alignment. After all fins are attached, sight from the front or rear of the rocket and make sure all fins are on straight and evenly spaced around the body tube. Some kits contain a shaded end view in the directions to check proper fin spacing. Stand rocket on end (upside down) so fins can dry properly. Make sure the rocket can't be knocked over while fins are drying.

10) Use glue fillets to help strengthen the fin/body tube attachment. That is, run a bead of glue down each side of the fins where it meets the body tube and smooth it with your finger.

Painting Your Rockets (You, helpers and kids)

1) Fill the balsa wood fins with a sanding sealer. Balsa wood absorbs paint and the finish is dull. Sealing them makes the fins smooth for a nicer finish.
2) Fill the body tube grooves with a sealer to make it smooth. Many people prefer Elmer's Finishing Wood Filler. Again, this step makes for a nicer finish.
3) Tape around the shoulder of the nose cone before you paint it. Paint on the shoulder could make a tight fit. You can remove the tape after painting.
4) Spray paint is definitely the way to go. They will give a smoother finish than brushed on paint. I would not suggest buying small cans of model spray paint. They will not go very far. Many people use the larger cans of Krylon. These work great. You can also buy similar paint in large cans that is much cheaper at discount stores. This dollar or so savings per can will add up when buying many colors.

5) Make a wand of a rolled-up newspaper or coat hanger and put it into the bottom of the body tube. This enables you to hold the rocket while avoiding overspray. Wearing an old glove also helps protect your hand.
6) Use a gray or white primer as your first coat.

7) If painting different colors, use masking tape and newspaper (or the shiny coupons from Sunday's paper) to mask areas between colors.

8) If painting multiple colors, start with the lightest color first and work toward the darkest.

9) Spray the paint on in a few light coats, not one big one. The paint will run and bubble if you try to do everything in one coat. Patience! Light even coats.

10) When applying water decals, use a soft brush to move the decal on the rocket until it is in place.

11) Pat the decal dry to remove the bubbles. You can use a paper towel, Kleenex or soft cloth for this.

12) When the decals are dry, apply a coat of clear paint to help hold the decals in place. If your rocket has a clear paint finish, you can then use a little window cleaner to remove smudges.

Pre-Launch (You and helpers)

1) Before the kids arrive for the launch, prepare the field. Set up your launcher and launch control table. Use chalk or temporary marking paint (if permission is given) to mark a circle 15 feet around the launch pad for people to stand behind. Note the wind direction and speed. If the wind is stronger than 20 miles per hour, you should postpone your launch. Since you are probably more concerned with launching and retrieving the rockets than which one reaches the highest altitude, point the launch rod slightly into the wind to ensure successful recoveries. Rockets flown this way will nose uprange, into the wind, and give you more room to recover them.

2) Recruit other adults or older scouts or 4-Hers to help. Assign someone that knows rocketry to be the Range Safety Officer. The RSO inspects the rockets prior to launch. He/she makes sure the motor and igniter are in correctly and checks nose cone for loose fit. You may also want to be sure others will be there to help corral the excited young people.

3) Establish the launch order beforehand. When it comes to kids, everyone wants to be first. If you establish an order beforehand, then you will prevent any problems. There is alphabetical order, reverse alphabetical order, age, experience, drawing names out of a hat, etc. Just pick a method before the launch and then stick to it at the field.

4) Be sure to have extra batteries for your launch controller. Nothing will disappoint your youngsters more than not having the motor ignite. When launching a large volume of

rockets, batteries can get worn down quickly. Having extras on hand means no disappointed future astronauts.

5) Set the launch pad so the top of the launch rod is above eye level. Also be sure to put the Safety Cap on the rod.

Your Rocket Launch (You, helpers and kids)

1) Go over the NAR Safety Code again, this time with everyone. Now is the time to go through the Safety Code with them and have them sign the bottom to show they will comply with ALL rules.

2) A few additional rules that I use in my classroom launches.

   A. Everyone pays attention at all times!
   B. Everyone stands behind the 15 foot circle during the launch.
   C. To keep rockets from getting stepped on and broken, each person retrieves his/her own rocket. After pushing the button and launching rocket, replace the safety cap and retrieve your rocket. (OR, you can designate certain people to be rocket retrievers. For instance, the previous launcher retrieves the next person's rocket.)

3) As a group, prepare the rockets for launch. Follow your rocket's directions for inserting the recovery wadding, the recovery system (parachute or streamer?), motor, igniter, and plug.

   Launch Preparation Steps
   a) Loosely crumple each sheet of wadding separately and push into top of body tube. A pencil or old knitting needle is a perfect tool for this.
   b) Fold parachute or streamer as tightly as possible. It should fit loosely so that it ejects easily. Fold the parachute according to the kit directions or use the Carlisle Method shown in The Handbook of Model Rocketry.
   c) Instead of tying your parachute to the nosecone, tie it to a fishing spinner or snap swivel. This enables you to hook it on the nosecone and then take it off for storage so it can hang open and not be crumpled.
   d) If the weather is humid, sprinkle a little baby powder in the parachute before folding to prevent it from sticking.
   e) Write your name and phone number on the streamer or parachute with a permanent marker. If it gets lost, someone can let you know. You could also write it on a piece of tape and put it around the shoulder of the nosecone.

4) Everyone goes to launch field. Have everyone go to their proper positions and BEGIN LAUNCHING!
5) Some additional ideas to spice up your launch.
   a) Use flags to mark where the rockets land and see whose rocket lands closest to the launch pad.
   b) Use altitude trackers (available in hobby shops) and record the altitude that each rocket reaches.

Post-Launch (You, helpers and kids)

1) Pick up your field. It is a good idea to have everyone spread out and pick up all wadding, igniters, plugs, and spent motor casings. Let there be no sign that you were there.

2) Plan your next launch. There is a good chance that many of the kids will want to launch again. Model rocketry is addicting!
3) Look for other resources. Some of your rocketeers will be interesting in finding out more. You can point them to these resources so they can continue their exploration of this exciting hobby.

Internet Resources

National Association of Rocketry - www.nar.org

The world's largest and oldest organization supporting the hobby of rocketry, NAR membership benefits include:

- Sport Rocketry, a 48 page bimonthly magazine
- connections to NAR local clubs
- discount coupons for special offers from manufacturers
- NAR Technical Services (NARTS), which stocks for dozens of technical reports, plans, scale data and software not available from any other source.

Usenet Newsgroup - rec.models.rockets

Accessible from the NAR website, this active discussion group is visited by 55,000 modelers in an average week. Here, you can get a wealth of information from other rocketeers.

Rocketry Online - www.rocketryonline.com

An active website with connections to virtually all rocket manufacturers and suppliers, ROL as it is known, also features a tips library and discussion groups.

Yahoo - www.yahoo.com

Go to Outdoor Recreation, to Hobbies, to Rocketry, to find numerous personal and commercial websites covering all aspects of rocketry.

Printed Resources

Several of these were used in the preparation of this document. Sport Rocketry magazine, available as an NAR membership benefit, and at retail stores carrying Kalmbach publications

Stine, G. Harry, The Handbook of Model Rocketry, Sixth Edition, New York, John Wiley and Sons, Inc., 1994

Wiersbe, Bob (Compiler), NIRA'S Big Book-O-Tips, Volume 1, available from National Association of Rocketry Technical Service (NARTS)

Various rocket kit directions themselves

Andy Heren, Rcktnut007@aol.com.

Checklist for "Successful Rocketry for Scouting, 4-H, and Other Youth Groups"

By Andy Heren, Rcktnut007@aol.com

Getting Started

Assigned to:_____ _____

[ ] 1) Build, launch, and recover a model rocket.

[ ] 2) Find and read The Handbook of Model Rocketry by G. Harry Stine.

[ ] 3) If you know another adult or a young person who is into rocketry, ask him or her for help.

Preparing for Your Group's Activity

Assigned to:_____ _____

[ ] 1) Decide which rocket your group will build.

[ ] 2) Select your launch field and get permission to launch.

[ ] 3) Decide where to buy the rockets.

[ ] 4) Decide how to pay for the rockets.

[ ] 5) Be sure to order one for yourself.

[ ] 6) Think about which motor to buy and use.

[ ] 7) Order your materials so they arrive at least two weeks ahead of time.

[ ] 8) Gather all building supplies.

[ ] 9) Think about your meeting place.

[ ] 10) Think about how much time you have.

[ ] 11) Arrive early and get everything set up before the kids arrive.

[ ] 12) Read the NAR Safety Code so you are familiar with it before your group begins their work.

Building Your Rockets
Assigned to:_____ _____

[ ] 1) Have a lot of extra patience.

[ ] 2) Go slowly through the directions so that the entire group can keep up.

[ ] 3) This would be a good time to have other adults there to help.

[ ] 4) Go through all steps in building and then paint rockets.

[ ] 5) Read all instructions first.

[ ] 6) Use the right kind of glue.

[ ] 7) Sand balsa fins properly.

[ ] 8) Make the fin joints strong with two simple tricks.

[ ] 9) Check your fin alignment.

[ ] 10) Use glue fillets to help strengthen the fin/body tube attachment.

Painting Your Rockets
Assigned to:_____ _____

[ ] 1) Fill the balsa wood fins with a sanding sealer.

[ ] 2) Fill the body tube grooves with a sealer to make it smooth.

[ ] 3) Tape around the shoulder of the nose cone before you paint it.

[ ] 4) Spray paint is definitely the way to go.

[ ] 5) Make a wand of a rolled-up newspaper or coat hanger and put it into the bottom of the body tube.

[ ] 6) Use a gray or white primer as your first coat.

[ ] 7) If painting different colors, use masking tape and newspaper (or the shiny coupons from
Sunday's paper) to mask areas between colors.

[ ] 8) If painting multiple colors, start with the lightest color first and work toward the darkest.

[ ] 9) Spray the paint on in a few light coats, not one big one.
[ ] 10) When applying water decals, use a soft brush to move the decal on the rocket until it

is in
place.

[ ] 11) Pat the decal dry to remove the bubbles.

[ ] 12) When the decals are dry, apply a coat of clear paint .

Pre-Launch
Assigned to:_____ _____

[ ] 1) Before the kids arrive for the launch, prepare the field.
- chalk line 15 feet away from launcher
- angle the launch rod properly

[ ] 2) Recruit other adults or older scouts or 4-Hers to help.

[ ] 3) Establish the launch order beforehand.

[ ] 4) Be sure to have extra batteries for your launch controller.

[ ] 5) Set the launch pad so the top of the launch rod is above eye level.

Your Rocket Launch
Assigned to:_____ _____

[ ] 1) Go over the NAR Safety Code again, this time with everyone.

[ ] 2) A few additional rules
- Everyone pays attention at all times!
- Everyone stands behind the 15 foot circle
- Each person retrieves his/her own rocket.

[ ] 3) As a group, prepare the rockets for launch.

[ ] 4) It's Time To Fly!

Post-Launch
Assigned to:_____ _____

[ ] 1) Pick up your field.

[ ] 2) Plan your next launch.

[ ] 3) Look for other resources.