NFFS Website - Science Olympiad Student Resources – How to get started - Overview of Glider Design, Construction and Kits
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What is the best glider design?

- If you are new to the event or have a limited amount of time, build a proven good performing design.
- If you have an experienced coach and have a significant amount of time for flying practice a custom design can be considered.
- Success in the glider event is 20% design and 80% flying practice and building to minimum weight.
- At the very start of the school year, arrange to get gym time for flying practice. Meet with your school principal or board to get this done, if necessary. Two 3-hour practices each month are recommended. Ask to have the gym blowers off, or at least turned to their very lowest setting.
- You can be very successful flying a proven design or kit without customizing.

Should I build a kit or from scratch?

- If you are new to the event and/or have limited time, build one of the excellent kits on the market.
- A "best kit" depends upon the time you have to commit and your objectives. A top-level kit can take 6-8 hours to build and will get flights of up to 30 seconds. A mid-level kit will take 2-4 hours to build and should fly 20-25 seconds or a little better if built to minimum weight. A basic glider takes less than an hour to build and should fly 10-15 seconds. Often a basic glider has a short wingspan to make them less expensive; 8" span is common.

Kit Manufacturers

- Freedom Flight Models – Top-level kit with excellent written and pictorial instructions; a little more expensive and more challenging to build - https://www.freedomflightmodels.com/
- J&H Aerospace – Top-level and basic-level (Nat Catapult Glider) kits available with excellent video instructions https://jhaerospace.com/product-category/free-flight-kits/indoor-gliders/
- Retro RC Kits – Good medium-level kits; a little less expensive https://retrorc.us.com/catapultlaunchglidersclg.aspx
- Guru Engineering – Good medium-level kits; less expensive https://www.guruengineeringtech.com/
- Wards Scientific – Build materials; official kit supplier of Science Olympiad

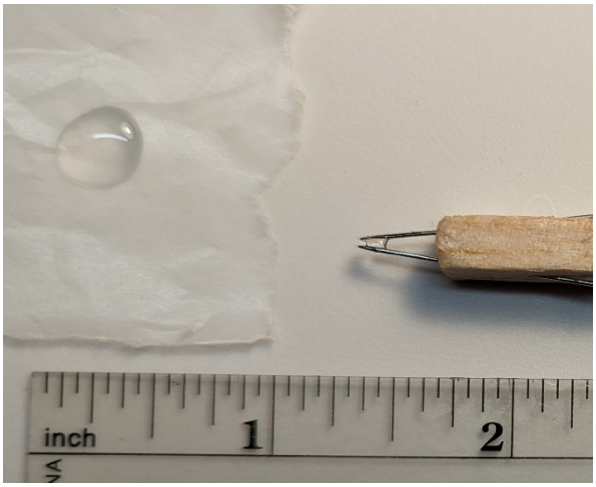
Building Custom Glider Designs

- These two websites feature a number of Academy of Model Aeronautics (AMA) glider designs that you can borrow ideas from:
    - See "Indoor Standard Catapult and Unlimited Gliders" here. AMA uses "catapult glider" and not "elastic launch glider" https://amaglider.com/
    - Type the word "glider" in the search box on this page to see current designs by the record setting and multiple national champion glider flyer, Kurt Krempertz: https://indoornewsandviews.com/
- As very high-quality wood is needed to build custom gliders that are minimum weight, you will want to order specific density and possibly specific grain wood from suppliers like: National Balsawood Co., Balsa USA or Specialized Balsa Wood. Be aware that shipping charges can be high, so you might want to combine glider with Boomilever event wood orders. Or, your school could collaborate with other local schools to put in a combined order and share shipping costs.
- Also, carbon tow or carbon strip and possibly tapered carbon tubes and thin high-quality foam for flaps will most likely needed for custom gliders. Here are of suppliers of carbon:
    - https://www.indoorffsupply.com/shop/tapered-carbon-tubes-for-gliders J&H Aerospace also supplies tapered carbon tubes
    - https://www.cstsales.com/Carbon_Fiber_Strips.html and https://www.cstsales.com/a-carbon-fiber-tow.html
    - At this time, only Freedom Flight Models supplies the good lightweight foam for flaps.

What else do I need to start? What glue should I use? Tips, etc.

- Read the kit instructions twice before starting. Ask questions in the Scioly.org forum here for quick help from experts. Go to Build Events/Elastic Launch Glider in the forum https://scioly.org/
- Build with accurate alignment and with “gap free” joints. If you misalign a part, cut or crack the joint and do it over again.
- Good quality fresh cyanoacrylate (CA or “super glue”) for almost all joints. Fresh glue will bond in seconds. Glue that has been sitting on a store shelf for a year will not work. “Thin” CA if carefully applied to accurate joints can be a little lighter. “Medium” CA preferred by most teams and is also fine; you can buy at most hardware and craft stores. Favorite brands include, Zap a Gap, Bob Smith, Instacure, Gorilla Glue and Loctite (the “gel” viscosity glue is not necessary and is heavy).
- Foam safe glue: for gluing foam to balsa, you will want to use foam safe CA or Weldbond (ACE Hardware). Regular CA will melt foam.
- Make a simple CA glue tool as pictured below to apply the correct small drop to each joint. Applying glue directly from the bottle adds 5% or more to the airplane weight. Put a medium sized blob of glue on a small square of wax paper and pick up a tiny drop with the tool for each joint.
- Duco Cement is also handy for joints that you need a little time to position (like carbon tow on the fuselage). This is a strong light glue that dries and cures slower than CA. This you can buy at most hardware stores like Ace Hardware.
- You can build on any flat surface, but a foam project panel is handy and available from the most hardware stores like this https://www.homedepot.com/p/Project-Panels-Formular-1-in-x-2-ft-x-2-ft-Rigid-Foam-Board-Insulation-Sheathing-PP1/203553730





Figures 1-2: Simple glue tool; 1/4" sq x 4.5" balsa with pins. Correct size glue drop picked up by capillary action.