

## The FMU Regatta!

Building a cardboard boat is all about trying to meet "The Challenge":

**BUILD A PERSON-POWERED CARDBOARD BOAT THAT IS CAPABLE OF COMPLETING ONE TRIP AROUND THE 500-YARD COURSE ON DURANT POND.**

**Along** the way, you will enjoy encountering and dealing with many small details. But look ahead to the satisfaction of knowing you accomplished something that most people won't even try -- building a boat made of corrugated cardboard.

**First** things first . . . start with some objective in mind. Maybe you want to build the fastest boat at the Regatta. Perhaps you are more interested in one of the Judges Awards for design or eye appeal. Maybe you want to win the Team Spirit Award. Perhaps you want to get on television or be the featured photo in the Student newspaper. Or just maybe you want to take home the Titanic Award for the most spectacular sinking.

**Next** . . . start with a **design idea**, a vision of what you want your cardboard creation to look like. But consider this first -- it doesn't have to be a boat at all! It can be any design you like or want to try out. Some races have had replicas of jeeps, exotic cars, full-scale pickup trucks, school busses, fire trucks, and other vehicles. We've seen space shuttles, Elvis on his guitar, beds, foldout soft drink cans, personal computers (with a mouse that trailed in the water), a raft with a trailing shark fin, a floating outhouse, a taco, a bratwurst, a giant Tootsie Roll, Tessie the Loch Ness Monster, Deidra the Dragonfly, the Statue of Liberty hand (from "Planet of the Apes"), and so much more. Oh, sure, we've had lots of boats too: submarines, aircraft carriers, PT boats, lake freighters, pirate ships, the Exxon Valdez (with simulated oil slick), and so on.

**Try** this to **save time** . . . **build a model** using a manila folder or other heavy paper or lightweight cardboard. That way, you can fold, re-fold, and fold again to your heart's content. You can cut it up, glue it together, and try out your design idea in small scale before working on a full-sized creation. Or you can throw out an idea that sounded great, but just won't work, then try something else before you have wasted any cardboard.

**How** about a **little science**? If you want, you can toss in a little physics or other sciences. Maybe you will choose to calculate the **displacement** of your design idea so that you will have some certainty about the buoyancy of your design. Here's the basic number: a cubic foot of water weighs about 62 pounds. That means that a 180-pound man will float in a boat that is 1 foot by 1 foot by 3 feet -- of course, that could be a bit uncomfortable! But at least you would know just how much boat you will need for you (and your crew) so you don't overdesign it and add unnecessary weight.

**Then** again, **how about some art**? Perhaps you have a really creative idea, maybe something that nobody has done before. Unless you get your kicks from putting in lots of hours and making discoveries along the way -- hey, sometimes that can be great fun -- you may want to at least try out that unique or innovative idea in model form. If you want to put a palm tree in the middle of

your "desert island," be sure you won't make the whole thing top-heavy -- unless, of course, you are trying for the Titanic Award.

**Now, go full-scale . . .** but first, think about this: make sure your creation will be able to get out the door of wherever you choose to build it. There are many tales of woe about boats that had to be dismantled -- or even trashed and rebuilt -- just because no one thought about the size of the boat and the size of the door. Also think of how you are going to transport it to Campus for the Race.

**Where to get cardboard?** This is a scavenger hunt as well as a boat race. . . You might get cardboard from appliance stores. The shipping boxes for refrigerators and big freezers can be good possibilities. Maybe you can get boxes for TVs, bedding, bookcases, or other furniture. Of course, you can also use smaller sheets and glue them or fasten them together. We are collecting cardboard at the FMU warehouse, please once your team is registered, please contact the Race organizers for that.

**Where to get the Duct Tape?** As this can be quite expensive, we will be distributing rolls of tape to the Registered Teams.

**Creative** problem-solving is the name of the game. Whether you get your creative insights from methodical effort or from wide-ranging trail-and-error, building a cardboard boat can be -- no, make that, will be -- both fun and challenging.

**FYI** -- there are no plans, no pre-set designs, no step-by-step instructions here . . . no recipe cards, no fill-in-the-blank formats. The first ingredient in cardboard boat-building is creativity. The second important ingredient is problem-solving. Then there is cardboard, of course -- and it has to be corrugated.

**Hey**, maybe you are more the "**wing it**" type -- okay, get some cardboard, fold it a little, cut out any excess here and there, add a little glue or duct tape, maybe some paint or water sealant, and presto-chango, you have a boat for the Regatta.

**Let's see, other materials** . . . you can use glue and tape. You can use paint and water sealant and other stuff. But first, take a look at "The Rules" to find a short list of substances that are not to be used. We're not trying to make it tough on you, but we are steering you away from stuff that is toxic, either for you or for the environment.

**Handling cardboard** -- you will find it easier and more fun if you keep in mind a few tips.

- You can have strength and still keep your boat light if you laminate layers of cardboard. In fact, try placing one layer so that the corrugations run in one direction, then placing the second layer so that the corrugations run at a 90-degree angle to the first layer.
- To fold cardboard across the corrugations, consider scoring the line of the fold with the butt end of your utility knife or other rounded edge of a tool.
- Don't step on your cardboard! If you break the corrugations -- well, think about it.

- To keep your cardboard dry, don't forget to seal the edges with caulk or silicone. If water gets into your corrugations, you can have great fun watching it get drawn through the corrugation just like in a drinking straw. That may be okay when you have time to do something about it, but if you see this happen in the middle of a race . . . !!

**Here's** a bunch of other items to think about.

- A flat bottom is recommended. A V-shaped bottom is likely to tip over unless the V is very gentle.
- The lowest center of gravity is the most stable; kneeling or standing will cause you to tip over.
- Longer boats go faster, but they are harder to turn.
- Boats shorter than 10 feet are difficult to steer.
- For height, allow about 18 inches for you to sit and paddle effectively without the edge of your boat blocking your arms.
- For width, figure about 30 inches maximum for 1 person, 48 inches for two people.
- Paint all the surfaces before gluing, caulk the edges, then glue (carpenter's glue works great).
- Avoid oil-based stains, caulk, and glue because the oil soaks into the cardboard, may never dry, and this weakens the cardboard.
- Duct tape shrinks when it is painted.
- Clear tape melts when it is painted.
- Reinforced paper tape works well over caulked edges and seams.
- Forget about "glue guns" because that type of glue melts on hot days.

**Hey**, some of the fun is in the discovery. So that's it for tips. Now go for it! Keep in mind the other lessons you learn along the way. That will make building your next boat just that much easier.

**Have fun! Be creative! If you can dream it, you can do it!**