

THE HAWKS REGATTA 2016

Due on May 19, 2017 before 8 a.m.



Objective

Build a 1-5 person-powered cardboard boat that is capable of completing one lap in a 30 meter-long pool.

Method

Start with some objective in mind. Maybe you want to build the fastest boat. Perhaps you are more interested in one of the Judges' Awards for design or eye appeal. Maybe you want to win the Best-Dressed Team Award. Next... a vision of what you want your cardboard creation to look like. Try this to save time... build a model using a heavy paper. That way, you can fold, refold, and fold again to your heart's content. You can cut it up, glue it together, and try out your design in small scale before working on a full size 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. If you want, you can toss in a little physics. Calculate the dimensions of your boat so that you will have some certainty about its buoyancy. Here's the basic number: Water weighs 1 gram per cubic centimeter, 1 kg per 1000 cubic centimeters. One hundred kg will float if the volume of the boat is 100 cm x 100 cm x 10 cm. Remember that **your entire group must be in the boat!** Now, go full scale... but first, think about this: make sure your creation will be able to get out the door or wherever you choose to build it.

Resources

Where to get the cardboard? You might get free cardboard from appliance stores: shipping boxes from refrigerators and big freezers can be good possibilities. Maybe you can get free used boxes from TV's, bedding, book cases, or other furniture. Of course, you can also use smaller sheets and tape them together.

Building Tips

You can have strength and still keep your boat light if you use layers of cardboard. In fact, try placing one layer so that the corrugations run in one direction, then place 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 rounded edge of a tool. Don't step on your cardboard! If you break the corrugations – well, think about it. Keep your cardboard dry. A flat bottom is recommended. A V-shaped bottom is likely to tip over. 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 three meters long are difficult to steer. For depth, allow 0.5 meter to sit and paddle effectively without the edge of your boat blocking your arms. For width, figure about 0.5 meter for a kayak, about 0.6 meter for a canoe, about 0.75 meter for one person in a boat, and 1.2 meter for two people.

DO NOT USE OIL BASED STAINS, CAULK, AND GLUE OR ANY OTHER TYPE OF PAINT because the oil soaks into the cardboard and may never dry. This both weakens the cardboard and contaminates the pool. Do not use glue guns because that type of glue melts on hot days. Have fun and be creative!

THE HAWKS REGATTA AWARDS

Pride of the Race

Overall most creative design and best use of corrugated cardboard

Speed Racer

Fastest time across one length of the pool

Vogue Award

Costumes and boat may be funny, spiffy, or elegant...but they must be creative

Titanic Award

As discussed in classroom

The required supplies

Corrugated cardboard, clear packaging tape, duct tape of any color, permanent markers are allowed for writing or decorating

The List of Forbidden Materials

Two part glues, metal, plastic, wood, foam core boards, Styrofoam, non-corrugated cardboard, metal foils and metal paints, fiberglass resins and plastic epoxies, any other tape that is not mentioned above, paint of any kind. If you are in doubt, please ask Mr. Dev before you use it.

RUBRIC

Category	4	3	2	1
Construction-design	Design shows creativity and use of engineering principles.	Design shows an attempt at creativity and use of engineering principles.	Design uses appropriate materials.	Design uses inappropriate materials.
Construction-care taken	Great care taken in construction process.	Construction was careful, but 1-2 details could have been improved.	Construction was careful, but 3-4 details could have been improved.	Construction appears careless or haphazard.
Artistry – boat	The colors and designs are creative.	The colors and designs are coordinated.	The colors and designs are acceptable.	There was little attention paid to colors and designs.
Artistry-costumes	The costumes are creative and reflect the theme of the boat.	The costumes reflect the theme of the boat.	The costumes do not reflect the theme of the boat.	No costumes were used.
Function	Structure functions and holds up very well.	Structure functions and holds up well.	Structure functions fairly well, but partially breaks down.	Structure fails.
Speed	Boat travels course quickly.	Boat travels course moderately fast.	Boat travels course slowly.	Boat does not complete course.

Boat team names and members should be submitted to Mr. Dev by Friday, May 5, 2017. Boat must be at Sierra Madre pool by 8:00am on Friday, May 19, 2017. Boats will not be accepted if late. Modest swim wear and/or costumes are required. A zero for the project will be given if a boat is not entered. All crew members must be inside the "boat."

Bon Voyage!