

Singapore International Water Festival 2009

Solar Boat Race

REGISTRATION FORM

(Please submit/fax this to 6772-1974, Attn: AU YONG CHOONG PENG before 22 MAY 09)

Name of School: _____

Address: _____

Postal Code: _____

Name of Principal
(Mr/Mrs/Mdm/Ms): _____

Name of Teacher in-charge (Mr/Mrs/Mdm/Ms): _____

Tel No: _____ Fax: _____ Hp: _____

E-mail: _____

(Note: All teachers must provide a valid email address and mobile number)

TEAM NAME: _____

S/N	Student Name/Sec level	NRIC No.	Contact no.
01	(Leader)		
02			
03			

Singapore International Water Festival 2009

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Power from the Sun

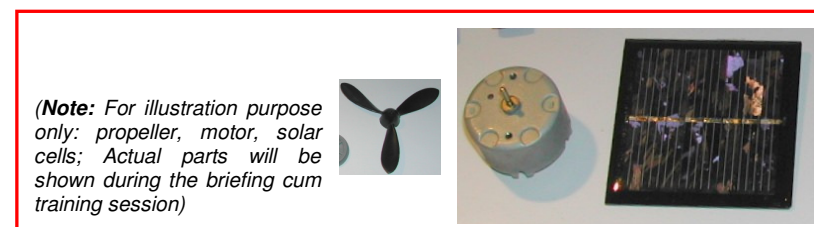
A design and build project

“Solar Boat Race – Power from the Sun” aims to promote and develop an interest in Engineering and Technology, and the use of renewable and solar power with school students. It is hoped that by doing this our future citizens, scientists and engineers will be more aware of, and participate in, a more environmentally friendly approach to energy usage.

It is a challenge open to secondary students with no more than 3 students per team (limit: 1 team per school). Each team must obtain their basic energy from the sun via standard solar panels. No batteries or mains adaptors are allowed. Due to the limitation of resources, only the first 64 teams registered (on first-come-first-served basis) will be invited to participate in the race

Registration

Participants will be asked to design and construct a solar-powered boat from the information provided. For more information, you may contact bmthian@sp.edu.sg or Thian Boon Meng @ 6870-6080.



The Competition

The race will take place at Marina Barrage (exact location to be confirmed later). All participating teams must report by 9.30am on **21 June 2009 (Sunday)**

How to enter

The competition is open to secondary school students. **Entry to the competition is free.** Registration form must be submitted to CPAuYong@sp.edu.sg or faxed to 6772-1974 before **22 May 2009**

Regulations and Specifications



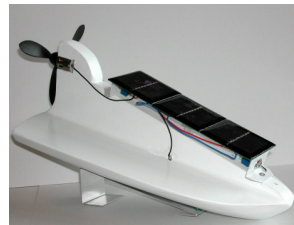
- ◆ Design a solar powered boat and to prove that your ideas work, build a model of it.
- ◆ The boat must be powered by solar panels. **A maximum of 3 solar panels** can be used to power the boat.
- ◆ The model must be made by the team who enter it and not use any commercially available boat hulls

Judging Criteria

The boat will be judged on how quickly it can cover the length of the pool (75%) and the innovativeness of the design of the boat (25%). In addition, bonus marks up to 10% will be given for model built from recyclable materials. (see page 5 – **Score Card** for more details)

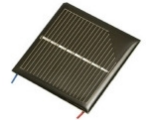
Regulations

1. The maximum length of the boat shall not exceed **250mm**.
2. The maximum width of the boat shall not exceed **150mm** including any methods of propulsion such as paddle wheels or oars.
3. The boat **MUST** be fitted mechanism which allows it to move along the left/right side of the water tank (note: boat may be fitted with rollers on both sides to keep the boat moving). Water lanes will be separated by floating pipe (diameter of 20mm)
4. **Only the solar cells** can be used **directly** to power the boat (no booster allowed)
5. Only **one** motor (**voltage capacity:1.5 V-3 V**) can be used and a maximum of **three** solar cells are allowed per boat.
6. Only **one water propeller or water screw is allowed per boat** but there is no size limit and any numbers of paddle wheels or oars are allowed (note: the minimum depth of the water is 100mm)
7. No commercially produced boat hulls are allowed and all boats must be constructed by the contestants who enter them.
8. No batteries are allowed.
9. The solar cells and motors must be fitted to the hull in such a way that it is not dangerous to the operator or other contestants and the solar cells must not be able to fall off into the water.
10. The winner will be the boat deemed by the judges to have covered the length of the tank in the shortest amount time and to have adhered to the rules. In the event of a tie, the tying boats will take part in a best of three lengths race of the tank.
11. In the event of any dispute the decision of the judges is final and the decision will be based on fairness and the guiding principles of friendly competition.



Reference:

◆ **Solar Cell** (up to a maximum of 3)
Specification (each): 1.5 volts (400-450mA) (size: 90x75mm), you may refer to the link for local supplier - TS-D&T Project, 503 Bishan St 11 #01-448 Singapore 570503
Tel: 62588441, email: dtpro@singnet.com.sg



◆ Boat (Design) - **IMPORTANT**

Basically, the boat model consists of two primary components which are the solar panel and the "submarine motor" (also known as Submergible Motor) and two other secondary components which are the steering mechanism and the rudder. To reinforce, the solar cell is fitted on the top of the boat model at an angle to obtain the maximum amount of solar energy. The motor is fitted at the stern bottom of the boat model and the wires are connected to the solar panel through a hole which will be drilled at the base of the model structure. The hole will then be patched up, preventing water from entering it. The distribution of the weight on the boat model will need to be even to prevent it from sinking. (**NOTE: bonus will be given for model built from recyclable materials**)



Recommended motor specification: Submergible Motor (Type: DC) Voltage: 1.5- 3 V. See local supplier for the motor (TS – D&T Project).

◆ Websites

- <http://www.fsec.ucf.edu/pvt/pvbasics/>
- <http://www.columbia.edu>
- <http://science.howstuffworks.com/solar-cell.htmBooks>
- <http://www.technologystudent.com/energy1/enex.html>

Score Card:

Criteria	Description	Weighting (%)
RACE Time	In total compliance to the Regulations as specified on page 2	75
	Race position (overall) 🏆 1 st = 75% 🥈 2 nd = 70% 🥉 3 rd = 65% 🏆 4 th - 5 th = 60%	
Innovativeness of Model	The features designed are innovative and very different from existing features.	25
TOTAL		100
BONUS (use of recyclable materials)	The judges can give bonus points for working model designed and built using mainly recycled materials (up to a cap of 10%)	

Attractive prizes for top winning teams (more details will be available later).