

CPEP Project Guidelines

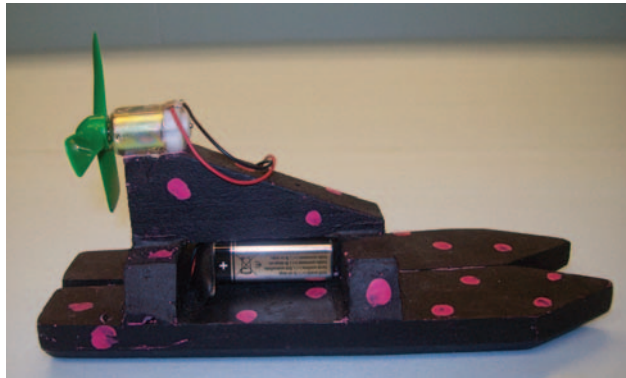
MIDDLE SCHOOL CHALLENGE: FAN POWERED ELECTRIC AIR-BOAT

Core Outcomes:

Students will demonstrate/define/illustrate the following: concepts of buoyancy, velocity, density and displacement, Archimedes' Principle and Newton's Third Law of Physics.

Challenge:

Using prefabricated CPEP kits, students are challenged to design, construct, evaluate, test and enter a fan powered electric air-boat in the CPEP Day competition.



Rules:

Each student team will construct a pontoon-style air-boat using the kits provided by CPEP. Each kit will contain the following:

- (1) 3/4" x 4 1/4" x 8 1/2" Styrofoam Hull Blank
- (1) Electric Motor
- (1) 9-Volt Battery
- (1) 9-Volt Battery Connector
- (1) 3" Dia. Propeller

These materials will allow teams to build a competitive fan powered electric air-boat. Please keep in mind that additional items such as an on/off switch or ballast weight may be used to enhance performance. However, the original 9-Volt battery, motor and propeller supplied in the kit must be used for the CPEP Day competition. Teachers will be supplied with (2) test batteries for classroom performance testing.

Boat Design:

Boats may be constructed using any Styrofoam hull design. However, hull designs must conform to the following standards:

- No more than 4" (10.2cm) in overall width and no more than 8.5" (21.6cm) in overall length.
- Must be designed to race in a 4.25" (10.8cm) wide by 10' (3m) long vinyl track.
- All boats must be evaluated, modified, and tested prior to the CPEP Day competition.

Judging & Scoring:

The official tracks for this event are 10 feet long and approximately 4.25 inches wide (inside dimension). One member from the team will bring the boat to the track, place the boat in the water and hold the boat in place until the start signal is given. False starts and shoving the boat forward will result in disqualification. Each team will

be provided two time trials per boat (the fastest of the two trials will be recorded). General boat repair can be made between the two time trials.



In addition: an award will be given for a boat with the same hull design specifications as previously mentioned that incorporates environmentally sensitive materials, as opposed to the Styrofoam that is currently used in the models.

HIGH SCHOOL CHALLENGE: PROPELLER POWERED ELECTRIC BOAT

Core Outcomes:

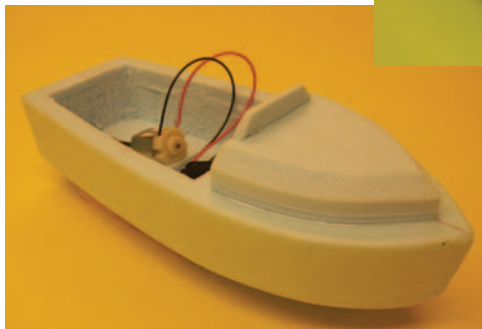
Students will demonstrate/define/illustrate the following: concepts of buoyancy, velocity, density and displacement, Archimedes' Principle and Newton's Third Law of Physics.

Challenge:

Using prefabricated CPEP kits, students are challenged to design, construct, evaluate, test and enter a single-hull propeller powered electric boat in the CPEP Day competition.

Rules:

Each student team will construct a single-hull boat using the kits provided by CPEP. Each kit



will contain the following:

- (1) 2" x 4" x 9" Styrofoam Hull Blank
- (1) Electric Motor
- (1) 9-Volt Battery
- (1) 9-Volt Battery Connector
- (1) 1" Dia. Propeller
- (1) 4" x 2mm Drive Shaft
- (1) Flexible Drive Coupler

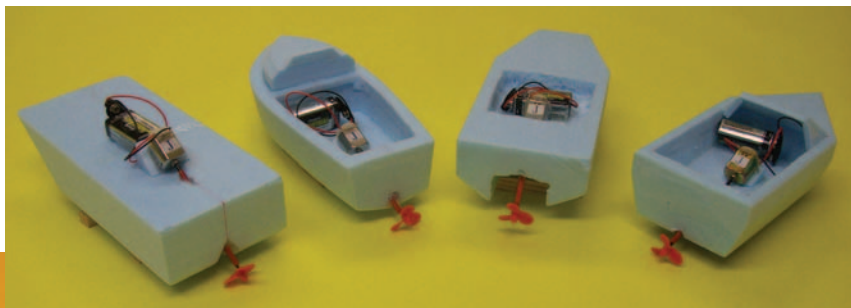
These materials will allow teams to build a competitive propeller powered electric boat. Please keep in mind that additional items such as an on/off switch or ballast weight may be used to enhance performance.

However, the original 9-Volt battery, motor, and propeller supplied in the kit must be used for the CPEP Day competition. Teachers will be supplied with (2) test batteries for classroom performance testing.

Boat Design:

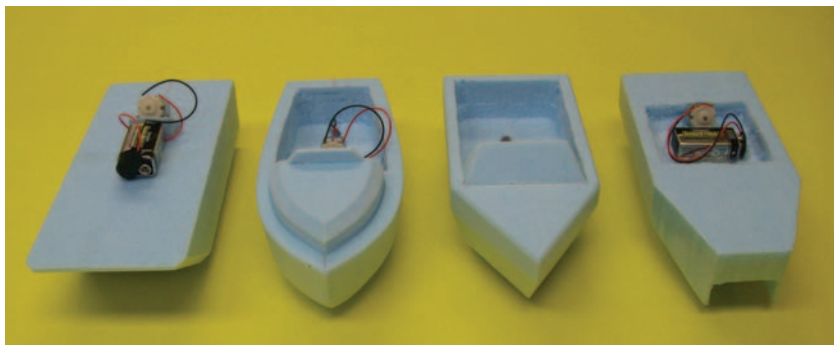
Boats may be constructed using any Styrofoam single-hull design. However, hull designs must conform to the following standards:

- No more than 4" (10.2cm) in overall width and no more than 9" (22.8cm) in overall length.
- Must be designed to race in a 4.25" (10.8cm) wide by 10' (3m) long vinyl track.
- All boats must be evaluated, modified, and tested prior to the CPEP Day competition.



Judging & Scoring:

The official tracks for this event are 10 feet long and approximately 4.25 inches wide (inside dimension). One member from the team will bring the boat to the track, place the boat in the water and hold the boat in place until the start signal is given. False starts and shoving the boat forward will result in disqualification. Each team will be provided two time trials per boat (the fastest of the two trials will be recorded). General boat repair can be made between the two time trials.



In addition: an award will be given for a boat with the same hull design specifications as previously mentioned that incorporates environmentally sensitive materials, as opposed to the Styrofoam that is currently used in the models.