FirstFuelCells.com

STAGE 3

DESIGN a FUEL CELL "GREEN MACHINE" GAME & HYDROGEN SAFE GAME FLOOR

FUEL CELL "GREEN MACHINE" PILOT PROGRAM© COMPETITION JANUARY 1, 2007

FirstFuelCells.com

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Office hours: 9 to 3:30 pm
Eastern Standard Time (Ohio)

Attachments included in this e-mail:
1. **FUEL CELL "Green Machine" Stage 3 & 4**
2. **DEADLINES**
3. **Release Form**

Support Engineers

Contact Information:

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Parker Energy Systems
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TDM Fuel Cell Technology
Chuck Tanzola
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(908)479-9875

Procedures:

- contact Scott or Chuck with engineering and parts questions, they will be happy to help you
- remember to please leave your contact information (phone number and e-mail address)

Sponsors:
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DLS Design Studio

Happy New Years from our team:
Diane, Chuck, Randy, Andrew, Tom, Mark, Scott, Anji, Ben, Barb

Thank you!
My best, Diane Sadowski

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DESIGN a FUEL CELL "GREEN MACHINE" GAME & HYDROGEN-SAFE GAME FLOOR

PAPER PENCIL CHALLENGE

ASSIGNMENT: Using your creativity and scientific knowledge design a Fuel Cell "Green Machine" Game & Hydrogen-Safe Game Floor

A. DESIGN PARAMETERS

1. **COMPETITION GAME FLOOR: Length = 54 feet, Width = 26 feet**
2. **ROBOTS: 4 robotic teams use the game floor during one round**
3. **ROBOT: Maximum weight 120 pounds, Minimum weight 1 pound**
4. **ROBOTIC MOVEMENTS: see list below; your game must include at least 3 movements**
5. **AUTONOMOUS MODE PLAY TIME: 10 seconds per round**
6. **PLAYER CONTROLLED TIME: 2 minutes per round**
7. **NO CONTACT: No robot to robot contact, include a SAFETY FEATURE with 10 m.p.h. safety impact margin in case there is contact - no parts ejected or broken, robots retain motor function after collision, include rules for penalty points**
8. **SAFE FUEL CELL SYSTEM CONTAINMENT BODY: protect the fuel cell/hydrogen source**
9. **DECIDE ON HOW THE FUEL CELLS WILL BE INCORPORATED INTO THE GAME: Are the fuel cells in the robots during competition, are they built into the carts for continuous recharging, where are they fueled, how are they fueled.**
10. **RULES: It's your game you make the rules and point system (SAFETY FIRST)**
    GAME OBJECTIVE: Your game must have a clear purpose and scoring rules

B. MOVEMENTS (include at least 3 or more movements into your game design)

scooping	carrying	inserting	peeling	fanning	throwing
sweeping	tracking	counting	pushing	pulling	filling up
passing	placing	stacking	rolling	switching	scattering
opening	closing	rotating	spinning	hiding	tucking
covering	lifting	netting	fishing	extending	corking
sitting	climbing	following	signaling	blowing	tunneling
grabbing	stringing	roping	carrying	delivering	sliding
dipping	spraying	stuffing	assisting	drawing	propping
taking	tossing	hopping	crawling	turning	bending
use of touch sensors		line tracing	pouring	curve tracking	
use of light tracking		use of voice recognition		contact alarm signaling	
use of obstacle course		use of optical eye		color changing	
spreading		dropping		your idea	

FINAL TASK REPORT: must include,
A. Robot Sketch (label)
B. Game Floor Layout (label)
C. Game Description, Rules and Point System

DEADLINE: FEBRUARY 1, 2007
TURN IN: TASK REPORT

Mail in Photos, Video and Journal, Release Form: they may be done in "Power Point", "Quicktime", "Word" or "PDF" formats. (Mail in CD, DVD, MiniDV Tape SP Format on Sony tape Stock recommended by video director). **Deliver to us** by registered mail to: FirstFuelCells.com, 11163 Blossom Ave., Parma Hts., Oh 44130, postmarked by midnight deadline of **February 1, 2007.** We have 20 states in this competition, please label your work by state, high school, team name & number. Include a **photograph(s) of your team** with small sign showing your school name, team name and number, and date. (team photo can consist of mentors, teachers, sponsors, students and all those who are helping out - **have fun!**)

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STAGE 4

INSERT & DEMONSTRATE A FUEL CELL HYBRID SYSTEM in a COMPETITION ROBOT

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My best, Diane Sadowski

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INSERT & DEMONSTRATE A FUEL CELL HYBRID SYSTEM in a COMPETITION ROBOT

MECHANICAL CHALLENGE

ASSIGNMENT: SHOW US WHAT YOU CAN DO

I. TEST your fuel cell hybrid system in:
- **A. LAST YEARS ROBOT or**
- **B. THIS YEARS ROBOT or**
- **C. A LAB ROBOT**

II. ACTIONS
- A. **Insert** new fuel cell hybrid system into your Robot
- B. **Journal** results:
  1. How does the fuel cell compare with the battery?
  2. What kind of energy output are you getting from the fuel cell system?
  2. What challenges are you facing?
  3. How much hydrogen is needed to run your system for 2 min. and 10 sec.?
  4. Diagram and show your calculations
  5. How are the fuel cell parts performing in your experiment?
  6. How many times will you need to recharge the hydrogen canister?
     a. during experimentation and testing
     b. during competition
  7. What fuel cell system parts do you expect to be replaced and why?
     a. during experimentation and testing
     b. during competition

III. ROBOTIC MOVEMENTS
- **A. Video/Photograph movements your robot is able to perform**
  1. **Example: forward, backward, rotation, throwing, picking up, stacking etc.**
     a. **Record how far and how long** you are able to perform the movements
     b. **What is needed for optimal performance**

IV. RECHARGING CART
1. **Challenge:** could you use your **FUEL CELL SYSTEM as a recharging unit in your robot's cart?** Show us how you would do this in your journal report.

V. TEAM STATEMENTS
1. **Give us your opinion:** What would you like to see happen for next years competition. What would you like to see added or changed, what sponsors from your local area could be included

Reminder we can not use hydrogen on this year's game floor. After photo, video and journal documentation of your teams robotic fuel cell accomplishments, the team will need to take out the fuel cell unit to compete in this year's FIRST 2007 Competition. Developments for a hydrogen safe game floor is currently in development.

DEADLINE: FEBRUARY 1, 2007
TURN IN: PHOTOGRAPHS/VIDEO, JOURNAL AND RELEASE FORM

Mail in Photos, Video and Journal, Release Form: they may be done in "Power Point", "Quicktime", "Word" or "PDF" formats. (Mail in CD, DVD, MiniDV Tape SP Format on Sony tape Stock recommended by video director). **Deliver to us** by registered mail to: FirstFuelCells.com, 11163 Blossom Ave., Parma Hts., Oh 44130, postmarked by midnight deadline of **February 1, 2007.** We have 20 states in this competition, please label your work by state, high school, team name & number. Include a **photograph(s) of your team** with small sign showing your school name, team name and number, and date. (team photo can consist of mentors, teachers, sponsors, students and all those who are helping out - **have fun!**)

FirstFuelCells.com

RELEASE FORM
Return to FirstFuelCells.com by February 1, 2007

2006-07 CONSENT, RELEASE, HOLD HARMLESS AND AUTHORIZATION TO REPRODUCE PHYSICAL LIKENESS

Program: FirstFuelCells.com, FUEL CELL "Green Machine" Pilot Program and Competition:

School Name/Address:_____

Team Name and # _____

This is a Consent and Release of Rights in favor of FirstFuelCells.com (FFC), and its officers, directors, employees, and assigns (FFC), as well as entities designated and approved to assist (FFC) in managing, contracting, sponsoring, hosting, conducting, evaluating or publicizing (including individuals and entities working with (FFC) in print, publication, television, broadcast or video media) (FFC) programs (FFC's Cooperating Entities") including any and all (FFC) competitions and events, as used below, "Participant" shall mean any individual, student, mentor, teacher, or volunteer involved in a (FFC) event. In consideration of the acceptance of my participation in one or more (FFC) Events, I agree to the following:

I hereby grant to FFC, to FFC's Cooperating Entities, and to the press and media admitted into FFC's Events the right to photograph, videotape, or otherwise digitally collect my likeness, voice and sounds (as "Works") during my participation at the FFC's Event(s). I further acknowledge the Works by FFC and the FFC's Cooperating Entities to be works made for hire, and otherwise irrevocably assign and grant to FFC and to FFC's Cooperating Entities all rights in these Works and the right to use or sublicense these Works and my name, likeness and biography, in FFC's discretion, in all media and in all forms and for all purposes, including without limitation, advertising and other promotions for FFC or the FFC's Cooperating Entities, without any further consideration to me or any limitation whatsoever. It is a FFC's policy not to print a minor's name with his/her picture without specific permission from his/her parent or guardian.

There are risks inherent in participating in FFC's Events, including the risks inherent in the construction of robots and structures, as well as in working with electrical connections, traveling to and from events, and participating in public competitions. These risks include the risk of bodily harm (including without limitation, death) and property damage. Being fully cognizant of the risks in participating in an Event, I hereby assume those risks. **Except to the extent due to the gross negligence or willful misconduct of FFC or FFC's Cooperating Entities, to the fullest extent permitted by applicable laws, I HEREBY WAIVE ANY CLAIMS OR CAUSES OF ACTION which I may now or hereafter have against FFC and FFC's Cooperating Entities arising out of my participation in any FFC's Events, and I will indemnify and hold harmless FFC and FFC's Cooperating Entities against any and all claims resulting from such participation.**

I HEREBY RELEASE FFC and FFC's Cooperating Entities and their respective successors, affiliates, licensees and assigns from all claims, demands, liabilities, damages, costs and expenses attorneys' fees, other professional fees and expenses, and any claims including, without limitation, claims for compensation, defamation, or invasion of privacy, or other infringements or violations of personal or property rights of any sort whatsoever that I may now or hereafter have against FFC and FFC's Cooperating Entities arising in connection with my participation in any FFC event. In the event I should sustain injuries or illness while involved in an FFC event, I hereby authorize FFC and FFC's Cooperating Entities to administer, or cause to be administered, such first aid or other treatment and medications I may bring as may be necessary under the circumstances, to include treatment by a physician or hospital of FFC's or FFC's Cooperating Entities' choice.

This Release shall be binding upon my heirs, personal representatives and assigns, and me and shall be governed by and construed under the laws of the State of Ohio, which shall be the venue for any legal action. This Release constitutes the entire agreement among the parties hereto with respect to the subject matter of this Release and supersedes any and all previous agreements among the parties, whether written or oral, with respect to such subject matter. FFC strongly believes in confidentiality of all contact information. FFC promises that it will not rent, sell or distribute this contact information to any organization other than those directly involved in the operation and support of FFC programs. FFC will be using the personal contact information provided here as part of its participant database and to contact the FFC participant and/or the participant's guardian as part of its research, program evaluation, or alumni outreach efforts, or other related outreach activities as they may occur. Unless I check this box to remove my consent, I hereby grant to FIRST the right to use the personal contact information provided here or FFC's research, program evaluation, alumni efforts and/or other outreach activities.
I understand that this form involves a release of legal rights.

_____

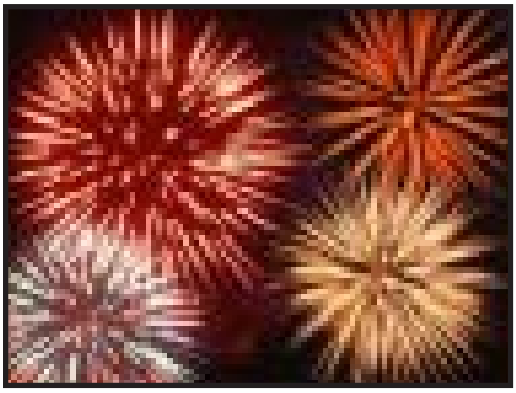
Participant Printed Name Participant Signature Date

Address: _____ City: _____ State:_____ Zip:_____
Phone: Home ( ) _____ Email address: _____
Age: _____ Gender: _____(M) _____ (F)_____
Race (optional) **[Please check one]**: OAfrican-American O Asian/Pacific Islander O Native American/Alaskan O White O Multiple races
Ethnicity (optional): O Hispanic O Non-Hispanic

For Participants under the age of eighteen (18) years listed above: I hereby consent and agree to the above on Page 1 (one) as the Parent/Legal Guardian of _____(minor's name), in which case "I", "me" and "my" as used herein shall refer to said minor.

_____ _____
Parent or Legal Guardian Signature Print Parent or Guardian Name

NEWS SHEET:
HAPPY NEW YEARS TEAMS!!



Happy New Years!

DEADLINES:

STAGE 2 due by **January 15, 2007**
STAGE 3 due by **February 1, 2007**
STAGE 4 due by **February 1, 2007**

UPDATES:

- **February 1 -28, 2007**
  Compiling of Presentation, Duplication, Judging, and Awards for the FUEL CELL Green Machine" Pilot Program
- **March 1, 2007 (FIRST Regional Competition Starts)**
- **April 12-14, 2007 (FIRST National Competition Starts)**

RELEASE FORMS: To be included into the final presentation, the RELEASE FORM must be e-mailed or received in our office no later than FEBRUARY 1, 2007 - DEADLINE

FREQUENTLY ASKED QUESTIONS

PARKER ENGINEERING NOTES: Graphite gaskets are not required to build the stack. They were eliminated from the kit shortly after the video was shot because we found that the stack was easier to assemble without them (with no effect on stack power output).

CURRENTLY IN DEVELOPMENT:

Currently accepting ideas for the HYDROGEN SAFE GAME FLOOR

TIPS:

I. Journal Writing (the following are some ideas of what you can find in a working journal)

research notes
action list
deadlines
time lines
progress report
delegation
calculations
sketches
photos
diagrams
discoveries
conclusions
parts lists

budgeting
suppliers
sponsors
resources
comments
opinions
complaints
presentation outline
parts to be replaced
problems and solutions
progress reporting to team
what your having fun with
greatest challenge

accomplishments
greatest achievements
actions completed and dated
contact information of team members
part order dates and contact information
suggestions for a better way of doing things
student - mentor - teachers - sponsors roles
teachers and mentors contact information
team member names and assigned duties
on going history of what you are doing
where to recharge hydrogen canister and costs
student - mentor - teachers - sponsors roles
suggestions for next year's teams

My best, Diane Sadowski