25TH ANNUAL 6TH GRADE BATTERY CAR RACE RULES

November 2016

Background

The Battery Car Race is a STEM based design and race competition for student built battery powered model cars. It is sponsored and organized by the Middle School Gifted Department at Ingomar Middle School. The Battery Car Competition is open to students in sixth grade, however some fifth graders may be considered for participation.

Administration and Organization

Multiple entries from each school may compete in the 6th Grade Battery Car Race held at Duquesne University on **Friday, February 17, 2017.** It is recommended that students work in teams of two, three or four. The snow make-up date has not been determined.

There will be a teacher workshop on Wednesday, December 14, 2016 at Moon Middle School for any interested teachers. We will begin at 9:30 am and finish by about 12:30 pm. At the workshop, teachers will view sample cars as well as discuss the details of the race. Please bring a "thumb drive" or some way of saving information that we review at the workshop. Student kits will be available for **$6.00 per kit** and they contain the official motor, a AA battery holder with a switch, and two screw eyes.

Battery Car Race Rules

Each entry in The Battery Car Race must use an official motor and the AA battery holder, which will be provided with your registration. The motor and battery pack must not be modified or tampered with in any way. Cars will be powered by a maximum of two, "AA" batteries.

All battery powered cars **MUST** include:

- the official motor
- a body*
- a frame*
- an eyelet that can be used to **QUICKLY** attach and detach the car from the guide wire
- no more than two "AA" batteries
- at least one driven wheel

*To stay within the spirit of the competition, the body and the frame must be **SEPARATE** from each other. The body of the car must use multiple materials, have structure and show evidence of design and construction. **Cars that do not meet these requirements will not be permitted to race.**

Design Documents

Each team must also enter a complete design document created using PowerPoint. These documents are to be sent **ELECTRONICALLY** to bcrace@comcast.net no later than 3:00 p.m. **on Tuesday, February 14, 2017**. Contact me with any questions or extenuating circumstances.

A complete design document contains the following. It may require more than one slide for some of these categories. These are MINIMUM numbers of PAGES/SLIDES.

- Page or Slide #1 — Title Page (see example for contents)
- Page or Slide #2 — Design Drawing - Sketch of the car design (computer generated or scanned sketch).
- Page or Slide #3 — Materials List
- Page or Slide #4 — Step-by-step and numbered assembly procedures
- Page or Slide #5 — A description of **one performance related creative feature** of the car.
- Page or Slide #6 — A description of **one obstacle** or problem encountered and how it was solved **OR** a description of a repurposed material used in the car.
- Page or Slide #7 — Team picture (all team members) with the car plus three (3) other photo's of the car under construction.

NO CAR WILL BE PERMITTED TO RACE WITHOUT A COMPLETE DESIGN DOCUMENT SENT ELECTRONICALLY.

Conduct of the Race

The race length is approximately 20 meters, with one-meter wide lanes. The race will be held on the hardwood dance floor of the Duquesne University Ballroom.

There will be a designated Car Repair Area where several tables will be set up with glue guns, soldering guns, etc. There will also be floor covering to protect from spills. **NO GLUING, SOLDERING, ETC. MAY BE DONE ANYWHERE EXCEPT THE REPAIR AREA.**

To start a race, the car will be turned on and one team member will hold a piece of wood (provided) called a **starting block** in front of the car on the edge of the finish line. When the start signal is given the wood will be lifted and the car will start on its own. False starts may result in disqualification from a heat. One member of the team must wait at the finish line to catch the car to prevent it from being damaged.

Team members may **NOT** accompany the car in its lane during the race. The only person on the track between the start and finish is the starter. Team members may not push the car or give any physical assistance on the start. They may not change the car's mechanical/electrical characteristics (e.g. shift a transmission) after the start of a heat. Physical assistance, unauthorized repairs, unauthorized people in the lane, or unsportsmanlike conduct will result in disqualification from a heat, as determined by the Race Officials.

One team member must be present at the finish line to stop the car. The car must remain in its lane at the finish line until the order of the cars can be established. Teams that leave the finish line prematurely or miss subsequent heats may be disqualified.

All cars will be connected to a guide wire consisting of 20# test fishing line. The line will be a fixed height off of the track, 1.5 centimeters, and cannot be adjusted up or down. **If a car comes off of the guide wire or if it interferes with another car, it will be disqualified from that race.**

Determination of Winners

This is a performance event; the fastest car over the 20 meters will be declared the winner. All races will be run in heats. There will be preliminary heats where each car will run three trials for time. The 16 fastest cars will then move onto the **semi-finals** where they will race, head-to-head in **double elimination** until there are four cars remaining.

The four remaining cars will race in the finals, which are **double elimination** until the winners can be determined.

Team members on the top four teams will receive medals and the top three teams will receive a trophy. There will also be a design award and a fastest car award given.

Hints

1. The hardest part of the design and construction of the car is the transmission. Most cars employ direct drive, gear drive, or pulley drive.

2. Remember, the floor of the Duquesne Ballroom is wood that has been waxed and can be slippery. Use wheels that will give you the best traction.

3. Bring a repair kit with you the day of the race. It may help for last minute repairs.

4. Alligator clips or spade connectors are good for connecting the battery pack to the motor.

5. Other materials you might need at your home school include:

Soldering gun	solder
Hot glue gun	balsa wood
Foam board	axle material (skewers, metal rods, etc.)
2 liter soda bottles	craft sticks
metal eyelets	