UW-Platteville 2015 Engineering Physics Zip Line

Rules
1. **Start time at 11:00** It is **OK** if you will not be on campus at this time, or if you have another Expo commitment – just let us know at foustd@uwplatt.edu / 608-342-1696 to schedule a different time.
2. Each team shall consist of up to and including three members except for the case when a school may have only one or two interested students. Multiple teams should be entered when more students are interested.
3. Design of the contraption should be original to the students with advisory help from the cooperating teacher.
4. Construction of the contraption should be by the students with advisory help from the cooperating teacher.
5. Allowed energy source = the battery.
   a. Voltage to motor must be ≤ **1.7 volts**
   b. Maximum battery voltage ≤ **1.7 volts**. (AAA, AA, C, D, etc…)
   c. I.e. no stored chemical or electrical energy, no solar cells.
   d. The supplied motor is the only means of converting battery energy into motion;
6. A **one page design description and narrative**, including budget, shall be submitted at the time of participation.

Expectations
1. **Build a system to carry the motor + battery + switch combination 15 meters along a suspended “zip line.”**
   Motor and switch are provided, as well as a sample of the zip line (twine).
2. The string is going to be held loosely between the two end supports with a drop of 15 cm from taunt in the center using a 100 gram weight that will be removed before each run.
3. The system must operate autonomously, using only components that were on board at launch.
4. The system will be launched by hand, with only a “nudge” allowed, if needed, to initiate motion. **No throwing!**
5. **Weight constraint:** your design must not be too heavy for the “zip line!”
6. You may choose to use the switch as part of your design – or simply as deadweight.
7. **The design with the fastest 15-meter crossing wins:**
   a. First tiebreaker = farthest distance; Second tiebreaker = fastest time.
   b. The EP Zip Line Challenge Committee will decide remaining **ties** on the basis of the **quality and clarity of the one page narrative**, robustness, and design creativity.
8. The EP Zip Line Challenge Committee also decides the winner of the “creativity” prize.
9. **T-shirts** to the teams with the top three times, and to the winners of the “creativity” prize.

Frequently Asked Questions (FAQ)
1. Can I disconnect the string and run it through my design and then reconnect it?
   a. **Not this time. You just got another design parameter!**
2. Can I launch my motor+battery with a rocket engine, or another explosive chemical? That would be cool!!
   b. I agree, but NO. The rocket engine & explosive use chemical energy, which isn’t allowed!
3. How is the transit time measured?
   c. The timer starts when you throw your switch. It stops when any part of your contraption comes in contact with anything other than the zip line, or it reaches an immobile, equilibrium state (i.e. it gets “stuck” on the zip line) or crosses the finish line.
4. Could I stretch a spring & fling it along the line?
   d. No – this would be converting your energy into stored energy!
5. Could I use the motor to wind up a rubber band or compress a spring?
   e. YES – in this case, the source of energy is the motor+battery; the rubber band is just storing that energy.
6. Can I use a remote control?
   f. **IF the battery – the sole power source – is on-board, powering the transmitter and the receiver**… then, yes.
7. I’d like to install magnets in the ceiling/floor. Is this OK?
   g. No – you’d be introducing another source of energy.
8. Your motor is wimpy. Can I use one of mine?
   h. **Sorry, no. Our wimpy motor is the only motor that can be directly connected to the battery.**
9. Can I blow on a sail?
   i. No… that would be another energy source, which isn’t allowed.
10. Could I add some additional electronics? I.e. use the battery for lights, sound system, etc.?
   j. You bet! But don’t try to sneak any pre-charged capacitors on board… ! Remember, one energy source.
11. I still have questions.
   k. Just shoot an email to foustd@uwplatt.edu, or call 608-342-1696.