

Part II:

- g. Teams will be given a set amount of time (20-30 minutes is suggested) to complete a written test.
- h. The following topics may be included:
 - i. Basic information and definitions about energy, work, heat and heat transfer including, but not limited to concepts of heat, temperature, temperature scales, thermal energy, conduction, convection, radiation and insulation.
 - ii. General information about renewable energy including but not limited to solar, wind, hydroelectric, tidal, oceanic tidal energy currents (OTEC), and geothermal.
 - iii. General information about energy conservation practices including but not limited to recycling, reusing, and using materials with greater efficiency.
 - iv. Mathematical relationships and equations used in determining heat loss and heat gain, specific heat, and heat transfer calculations.
 - v. In C Division formulas to determine power, energy consumption, cost effectiveness, etc. may also be required.

5 **SCORING:**

- a. The score for Part I is the sum of the low speed voltage (mV) + high speed voltage (mV).
- b. If the device fails during a run the score at that speed will be zero.
- c. The Part II written test will be worth a total of 50 points.
- d. A team's final score will be determined as follows (with highest score winning):

$$\text{Final score} = 50 \times (\text{Part I score} / \text{Highest Part I score of all teams}) + \text{Part II score}$$
- e. Ties will be broken by the best high speed voltage.

RECOMMENDED RESOURCES: <http://www.alliantenergykids.com>, American Wind Energy Association at www.awea.org, and www.kidwind.org.

NATIONAL SCIENCE EDUCATION STANDARDS: Content Standard B: All students should develop an understanding of motions and forces and transfer of energy. Content Standard E: All students should develop abilities of technological design and understandings about science and technology.

