

## **2011 RETURNING EVENTS**

**Divisions B and C**  
(Alphabetically)

**Anatomy B**  
**Anatomy & Physiology C**  
**Astronomy C**  
**Battery Buggy B**  
**Can't Judge a Powder B**  
**Chemistry Lab C**  
**Compute This B**  
**Crime Busters B**  
**Disease Detectives B**  
**Disease Detectives C**  
**Dynamic Planet B**  
**Dynamic Planet C**  
**Ecology B**  
**Ecology C**  
**Experimental Design B**  
**Experimental Design C**

**Forensics C**  
**Fossils B**  
**Fossils C**  
**Junkyard Challenge B**  
**Meteorology B**  
**Mission Possible C**  
**Mousetrap Vehicle C**  
**Ornithology B**  
**Ornithology C**  
**Remote Sensing C**  
**Road Scholar B**  
**Shock Value B**  
**Solar System B**  
**Technical Problem Solving C**  
**Wind Power C**  
**Write It Do It B**  
**Write It Do It C**

### **Anatomy (B)**

- ☐ This event encompasses the anatomy (structure and function) of the muscular and respiratory systems and the effects of aging and diseases on them
- ☐ Each participant must bring a writing implement and may bring a non-programmable, non graphing calculator.
- ☐ Each team may bring one 8.5" X 11" two-sided page of notes that contain information in any form from any source.
- ☐ Suggested topics for state and regional tournaments are listed in the manuals.

### **Anatomy & Physiology (C)**

- ☐ This event encompasses the anatomy and physiology of the muscular, respiratory and endocrine systems.
- ☐ Each participant must bring a writing implement and may bring a non-programmable, non-graphing calculator.
- ☐ Each team may bring one 8.5" X 11" two-sided page of notes that contain information in any form from any source.
- ☐ What students should know about each of the three systems for Regional & State and National competitions is listed in the manual.

### **Astronomy (C)**

- ☐ Students will demonstrate an understanding of the basic concepts of mathematics and physics relating to galaxies.
- ☐ Each team member is permitted to bring either a laptop computer or a 3-ring binder (any size) containing information in any form from any source. All materials must be 3-hole punched and inserted into the rings.
- ☐ Each team member is permitted to bring a programmable calculator.
- ☐ No internet access is permitted.

### **Astronomy (C) (cont.)**

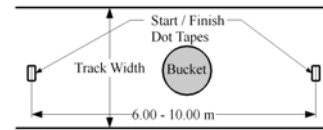
- ▣ (3a) lists the types of objects that questions will be about.
- ▣ (3b) lists laws, relationships, and constants students must have a working knowledge of.
- ▣ (3c) lists specific deep space objects (DSOs) that students need to know about and be able to recognize.
- ▣ (3d) lists types of tasks students may be asked to perform.

### **Battery Buggy (B)**

- ▣ Teams construct a vehicle that uses electrical energy as its means of propulsion, quickly travels a specified distance, and stops as close as possible to the **finish dot**.

- ▣ Changes to 2-a – Construction Parameters:

The exact target distance, **straight line**, must be **8.00 m** for regional, between **6.00 – 10.00 m** (1.00 m intervals) for state, and between **6.00 – 10.00 m** (0.50 m intervals) for national tournaments. At state and nationals, the distance is chosen by the Event Supervisor and is not announced until all vehicles have been impounded.



### **Battery Buggy (B) (cont.)**

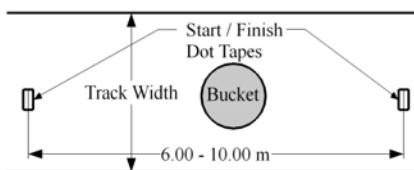
- ▣ Changes to 2-d – Construction Parameters:
  - Components may be purchased or made by the competitors (e.g., motors, gearboxes, bodies, and chassis). Electric components are limited to batteries, wires, motors, switches, resistors, capacitors, solenoids, and electro-mechanical relays. Any “black boxes” must be easily opened to allow inspection.
- ▣ Changes to 2-f – Construction Parameters:
  - The entire vehicle must fit in a 30.0 cm x 30.0 cm space when in ready to run configuration. There is no restriction on height of the vehicle.

### **Battery Buggy (B) (cont.)**

- ▣ Changes to 2-g – Construction Parameters:
  - Competitors must start the vehicle by actuating a switch using a pen, pencil, dowel, or similar device (which is not part of and does not travel with the vehicle). The switch must be designed so that the action of starting it is perpendicular (up or down) to the floor. A horizontally activated switch is a construction violation.
- ▣ Changes to 2-h – Construction Parameters:
  - The vehicle must have a fixed, pointed object whose tip is referred to as the **Fixed Point**. The fixed point must be on the front of the vehicle and within 1cm of the track's surface. All distance measurements must use this fixed point.

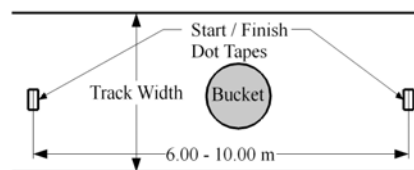
### **Battery Buggy (B) (cont.)**

- ▣ Changes to 3-a – The Track:
  - Tournament officials must announce the track width at least a week prior to the tournament.
- ▣ Changes to 3-c – The Track:
  - Competitors may choose either dot as a Start Dot to accommodate both left or right turning vehicles.



### **Battery Buggy (B) (cont.)**

- ▣ Changes to 3-d – The Track:
  - A 5-gallon bucket with a bottom diameter between 25.0 and 27.0 cm must be placed on the track, centered on the midpoint between the two Dots. The actual diameter of the bucket must be announced with the track width. There must be no visible line between the Start and Finish Dots.



### **Battery Buggy (B) (cont.)**

- ☐ Changes to 4-c-ii – The Competition:
  - Teams have 10 minutes to start up to 2 runs. Time used by the event supervisor for measuring and assessing is not included.
  - Teams may ask that the bucket be moved before each run in order to align and aim their vehicle. The bucket must be moved **ONLY** by the event officials. The bucket must be replaced when directed by the team before the run occurs.
- ☐ Changes to 4-c-iv – The Competition:
  - Teams must place the fixed point **directly over the “Start Dot”** and align the vehicle. Competitors may place a target on the track to aid in aligning the vehicle, but it must be removed by the team before starting each run.

### **Battery Buggy (B) (cont.)**

- ☐ Changes to 5 – Scoring:
  - Each run score is the sum of **Distance score and Time score**.
  - **Distance Score** is the distance from the fixed point to the Finish Dot in millimeters. This is a point-to-point measurement
  - **Time Score** is 25 times the official run time measured in seconds (to 0.01s) for the vehicle to move from the Start Dot to a complete stop.
  - The Final Score for the event is the run that gives the team the better rank
  - Ties are broken by the vehicle with the better non-scored run.

### **Can't Judge A Powder (B)**

- ☐ Students will test and characterize one **single** substance and then, based only on data they collect, answer a series of questions about that substance.
- ☐ Materials that students may and may not bring and that which the event supervisor must provide are the same as last year and listed in your manuals

### **Can't Judge A Powder (B) (cont.)**

- ☐ Safety requirements have changed a bit:
  - Pants or skirts that cover the legs to the ankles **and** a long sleeved shirt **that reaches the wrists and** A chemical apron or lab coat that reaches the knees;
  - Chemical gloves are optional.
  - Closed-toed shoes
  - ANSI Z87 indirect vent chemical splash goggles (#4).
- ☐ Students **MUST** wear these items or they **WILL NOT** be allowed to participate.

### **Chemistry Lab (C)**

- ☐ Teams will complete one or more tasks and answer a series of questions involving the science processes of chemistry focused in the areas of aqueous solutions **and oxidation/reduction**
- ☐ Students **MUST** bring: goggles and a writing implement.
- ☐ They **MAY** bring a non-programmable, non-graphing calculator – no reference materials are allowed.
- ☐ Pay **very** close attention to the safety requirements listed in your manual for eye protection and clothing!
- ☐ Scoring: 50% on **oxidation/Reduction** & 50% on Aqueous solutions.

### **Compute TAIs (B)**

- ☐ This event integrates Personal Computing technology, the Internet, and quantitative data analysis. Teams are presented with a problem that requires quantitative data capture from the public Internet and the organization and presentation of data in a graphical format. Short answer questions related to the problem are also included.
- ☐ Teams will be given a problem in the area of **weather and severe storms** with all required information to be located on websites within the **noaa.gov domain**

### **Compute TAIs (B) (cont.)**

- ☐ No URLs are required in the data table or the chart to identify the source of information, but all data must come from the noaa.gov domain
- ☐ Direct reference to MicroSoft products has been removed.

### **Crime Busters (B)**

- ☐ Given a scenario, a collection of evidence, and possible suspects, students will perform a series of tests. The tests, along with other evidence will be used to solve a crime.
- ☐ Students may bring **ONLY** the items listed under "Event Parameters - Students", **nothing** else.
- ☐ Any non-allowed items MAY result in up to a 10% penalty.
- ☐ Pay very close attention to the "Safety Requirements" section! ANSI Z87 (#4) chemical splash goggles are required.
- ☐ Along with reagents, solutions, burners and equipment, event supervisors will also provide other equipment as required.

### **Crime Busters (B) (contd.)**

- ☐ Competition:
  - There will be 4 parts plus the analysis of the crime.
    - A. Qualitative analysis
    - B. Polymer testing / natural and man-made substances
    - C. Paper chromatography
    - D. Crime scene physical evidence (5 topics)
    - E. Analysis
  - Complicated – make sure you and your students thoroughly understand what will be expected of them during competition.
- ☐ The only real change from last year is under "The Competition - B:" Polymer testing / natural and man-made substances

### **Disease Detectives (B & C)**

- ☐ Students will use their investigative skills in the scientific study of disease, injury, health, and disability in populations or groups of people with a focus on food borne illness.
- ☐ **Each participant must bring a writing implement and may bring a non-programmable, non-graphing calculator.**
- ☐ Each team may bring one 8.5" X 11" two-sided page of notes that contain information in any form from any source.
- ☐ Sample problems and resources are listed in your manual and may also be found on the national website ([www.soinc.org](http://www.soinc.org)).

### **Dynamic Planet (B & C)**

- ☐ Students will use process skills to complete tasks related to **Earth's fresh waters.**
- ☐ Each team may bring **FOUR** 8.5 X 11 double-sided pages of notes containing information in any form from any source and bring up to two non-graphing calculators.
- ☐ List of topics that MAY be covered is in your manual along with some representative tasks and suggested resources.

### **Ecology (B & C)**

- ☐ Students will answer questions involving content knowledge and process skills in the area of ecology and adaptations in featured North American biomes.
- ☐ 50% of this year's questions should address taiga and tundra ecologies. The rest will cover general ecological principles.
- ☐ **Each participant must bring a writing implement and may bring a non-programmable calculator.**
- ☐ Each team may bring one 8.5" X 11" two-sided page of notes that contain information in any form from any source.

### **Ecology (B & C) (cont'd.)**

- ☐ For division C at State and Nationals only, life history strategies may also be covered (e.g., age structure, survival curves, life tables, succession, R and K strategies).
- ☐ **At Regional and State level, the general ecological principles should focus on local and regional ecology.**
- ☐ Sample questions for Divisions B and C can be found in your manuals.

### **Experimental Design (B & C)**

- ☐ This event will determine a team's ability to design, conduct, and report the findings of an experiment actually conducted on site.
- ☐ Essentially unchanged from previous years.
- ☐ Students must bring **ANSI Z87** indirect vent chemical splash goggles and a writing instrument. Students may also bring a timepiece, ruler, and non-programmable calculator.
- ☐ As in the past, the rubric will be posted on the State Science Olympiad website.
  - <http://webs.wichita.edu/scienceolympiad>
- ☐ Pay attention to section 4-J Statistics.

### **Forensics (C)**

- ☐ Given a scenario and some possible suspects, students will perform a series of tests. These tests, along with other evidence or test results will be used to solve a crime.
- ☐ Students may bring **ONLY** the items listed under "Event Parameters". I strongly suggest that they bring them ALL.
- ☐ Pay close attention to safety requirements – they have changed a bit:
  - Pants or skirts that cover the legs to the ankles **and** a long sleeved shirt **that reaches the wrists and** A chemical apron or lab coat that reaches the knees;
  - **Chemical** gloves are optional.
  - Closed-toed shoes
  - ANSI Z87 indirect vent chemical splash goggles.

### **Forensics (C) (cont'd.)**

- ☐ Pay very close attention to **SCORING** and **COMPETITION** sections in your manuals so your students understand what to expect to be tested on and what to concentrate on during competition.
- ☐ This year, **Water Testing** is OUT and **Polymers** are IN.

### **Fossils (B & C)**

- ☐ Teams will demonstrate their knowledge of ancient life by completing selected tasks at a series of stations. Emphasis will be on fossil identification and ability to answer questions about classification, habitat, ecologic relationships, behaviors and the use of fossils to date and correlate rock units.
- ☐ Each **TEAM** may bring only one magnifying glass; one published field guide that they may tab and write in and one 3-ring binder (any size) containing information in any form from any source. The materials must be 3-hole punched and inserted into the rings (sheet protectors are allowed).
- ☐ Identification will be limited to species on the list at [www.soinc.org](http://www.soinc.org) but other species may be used to illustrate key concepts.

### **Fossils (B & C) (cont'd.)**

- ☐ All the questions will be chosen from the list of topics in your manuals.
- ☐ "representative station tasks" are also listed in your manuals.

## Junkyard Challenge (B)

- ☐ Teams must construct a device on-site to solve an engineering challenge.
- ☐ Eye protection – ANSI Z87 spectacles with side shields (#2) – will be required.
- ☐ This event requires an impound.
- ☐ Teams will be given 30 mins to build their device and be given 2 or less minutes to test it.
- ☐ Junk Box:
  - ☐ All materials must be brought in a "junk box" with a lid.
  - ☐ The sum of the widest outside dimensions including the lid (length + width + height) can not exceed 95.0 cm.
  - ☐ Teams may build their junk box or buy it.

## Junkyard Challenge (B) (contd.)

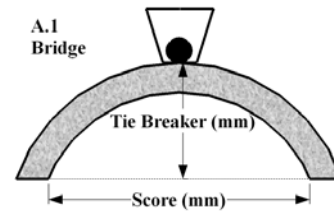
- ☐ Junk Box (contd.):
  - ☐ The junk box may not be used as part of their device unless otherwise specified in the rules.
  - ☐ The junk box must be impounded, checked for safety and measured before the event begins.
- ☐ Materials:
  - ☐ Up to 5 standard sized unaltered plastic practice golf balls (1-minimum)
  - ☐ Up to 8 standard sized unaltered golf balls (1-minimum)
  - ☐ Up to 10 standard size, unaltered tennis balls (1-minimum)
  - ☐ Paper or Styrofoam plates (max 10.5"), cups, and bowls (1c+1p min)
  - ☐ Paper of soft plastic straws/hollow stir sticks (< 24cm long).
  - ☐ Popsicle/craft sticks (12cm X 1cm) and/or wooden toothpicks.
  - ☐ Spools of any non-metallic string, line, thread, or tape.

## Junkyard Challenge (B) (contd.)

- ☐ Materials (contd.)
  - ☐ Paper (max 8.5 X 11 & <= 20# stock)
  - ☐ Rubber bands (<= #64 – ¼" wide)
  - ☐ Any plastic bags <= 1 gal.
  - ☐ Scissors (used as a tool ONLY).
- ☐ There are two different groups of challenges.
  - ☐ Challenge group A will be used at Regionals
  - ☐ Challenge group B will be used at State.
  - ☐ One of the selected challenges from the group will be announced by the event supervisor after impound.
- ☐ Challenge Group A (Regionals):
  - ☐ A.1 – Bridge.    A.2 – Tower.    A.3 – Cantilever.

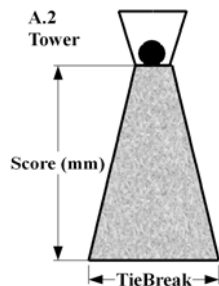
## Junkyard Challenge (B) (contd.)

- ☐ A.1 Bridge: Build a free-standing bridge with the longest open span that supports a cup and ball in the center of the span for at least 5 seconds.
- ☐ Longest open span wins.
- ☐ Ties will be broken by the height to the bottom of the load.



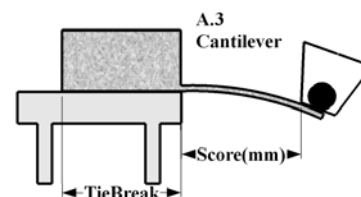
## Junkyard Challenge (B) (contd.)

- ☐ A.2 Tower: Build the tallest free-standing tower that supports a cup and ball for at least 5 seconds.
  - ☐ Greatest height to the bottom of the load wins.
  - ☐ Ties will be broken by the narrowest base measured to the outside edge of the supports at the widest span.



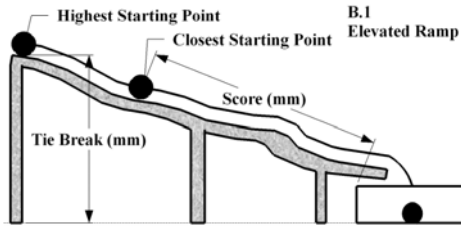
## Junkyard Challenge (B) (contd.)

- ☐ A.2 Cantilever: Build a cantilever that is laid out from the end of a table so that the length of the device projects horizontally from the table top and supports a cup and ball on the top of the cantilever for at least 5 seconds.
- ☐ The junk box and scissors can **not** be used as counter weights



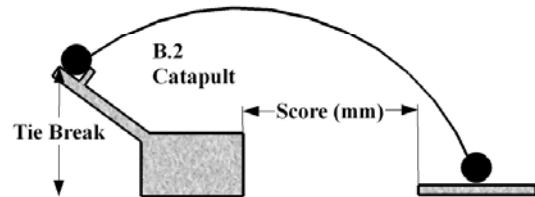
### **Junkyard Challenge (B) (cont'd.)**

- ☐ Challenge group B (state):
  - ☐ B.1 – Elevated Ramp.    B.2 – Catapult.    B.3 – Bouncer.
- ☐ B.1 – Elevated Ramp: Build a free-standing ramp that transports one or more balls from a starting point down to a collection container.



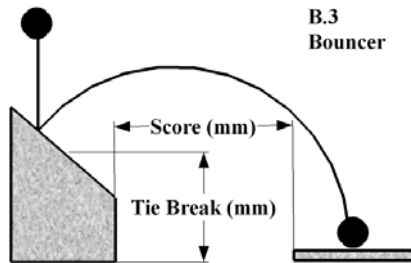
### **Junkyard Challenge (B) (cont'd.)**

- ☐ B.2 – Catapult: Build a free-standing catapult that launches one or more balls to hit, on first impact, a target plate provided by the team.



### **Junkyard Challenge (B) (cont'd.)**

- ☐ B.3 – Bouncer: Build a free-standing bouncer that bounces balls(s) from the bouncer to hit on first impact, a target plate provided by the team.



### **Junkyard Challenge (B) (cont'd.)**

- ☐ Lots of the challenge details were left out – Pay very close attention to them.
- ☐ There are bonus points available in group B challenges.
- ☐ Be sure you and your students understand how the scoring for each of the challenges work.
- ☐ Also know the types of violations that will rank your team below the non-violation teams, and avoid them!

### **Meteorology (B)**

- ☐ This event emphasizes the use of process skills within designated meteorological topics. Skills to be addressed and evaluated may include generating inferences, making predictions, problems solving, observing, formulating and evaluating hypotheses, and analyzing and interpreting data.
- ☐ Each TEAM may bring one 8.5 X 11 two-sided page of notes containing info. in any form from any source AND one non-programmable calculator.
- ☐ All questions will be selected from the topics listed in your manuals
- ☐ There are some representative types of activities in the manual too.

### **Mission Possible (C)**

- ☐ Prior to the competition, the participants will design, build, test and document a "Rube Goldberg®-like device" that completes a required task.
- ☐ This is an impound event!
- ☐ Eye protection – ANSI Z87 spectacles with side shields (#2) – will be required.
- ☐ The device must be designed to execute a sequence of tasks from the list in section 4 of your manuals.
- ☐ The starting task must be Task 4.a and the final task must be Task 4.n.
- ☐ Up to 8 additional tasks from 4.b to 4.m may be chosen and may occur in any order.

### ***Mission Possible (C)***

- ☐ Parallel tasks are not allowed.
- ☐ Non-listed tasks may be used but must contribute to the completion of the final task – they will not earn points.
- ☐ Task Sequence List must be submitted.
  - At impound or as directed by tournament director.
  - Do not need to list actions not in 4.a – 4.n.
  - Points for correct format (see www.soinc.org website)
- ☐ List of possible points awarded are in section 6.
- ☐ List of possible penalties are listed in section 7.
- ☐ The “ideal time” will be 60 sec at Regionals and 60-90 seconds at State – to be announced by event supervisor after impound.

### ***Mousetrap Vehicle (C)***

- ☐ Teams design, build, and test a vehicle using one or two snap mousetraps as the sole propulsion energy source to **push a plastic cup out** a distance and return to a point behind the starting line as quickly as possible.
- ☐ This is an impound event
- ☐ ANSI Z87 + High Impact Goggles (#5) must be worn while preparing and running the vehicle.
- ☐ Construction parameters are listed in section 3 – pay very close attention to the details – vehicle size and wheelbase have changed and the triggering device is specified.

### ***Mousetrap Vehicle (C)***

- ☐ The Track layout is specified in your manual and has changed from last year’s.
- ☐ The competition section has also changed (a lot) so pay very close attention.
- ☐ The scoring section is a bit complicated but with the example given, is clear – low score wins.

### ***Ornithology (B & C)***

- ☐ This event will test knowledge of North American birds on the official list.
- ☐ Each **Student** may bring:
  - one commercially published book or field guide (teams may tab the guide)
  - one two-sided page of the Official National Bird List (www.soinc.org).
  - one 8.5 X 11 two-sided page of notes that contain information in any form from any source
  - No other resources, electronic devices or printed labels will be allowed.
- ☐ The competition may be run as timed stations and/or a timed slide Power Point presentation.
- ☐ No other changes from last year.

### ***Remote Sensing (C)***

- ☐ Teams will use remote sensing imagery, science and math process skills to complete tasks related to an understanding of the causes and consequences of **human impact on the environment**.
- ☐ Each team may bring five 8.5 X 11 two-sided sheets of paper containing any information from any source.
- ☐ Each participant may bring a **metric ruler, a protractor a triangle** and any kind of non-graphing calculator, but no other resources.
- ☐ No other changes.

### ***Road Scholar (B)***

- ☐ Participants will respond to questions that may use one or more state highway maps, topographic maps, internet-generated maps, a road atlas, **and satellite/aerial images**.
- ☐ Event Parameter and Competition sections are virtually unchanged from last year.

### **Shock Value (B)**

- ☐ Students will compete in activities involving basic understanding of electricity, magnetism and simple electrical devices.
- ☐ Event Parameters: unchanged
- ☐ The Competition: The competition **MUST** consist of **BOTH** hands-on tasks and questions related to electricity, magnetism and electrical devices such as light bulbs, batteries and motors.

### **Shock Value (B) (cont.)**

- ☐ The competition must consist of at least one task / question from each of the following areas:
  - Basic electrical DC circuit theory.
  - Basic electrical device concepts
  - Basic electrical circuit construction / analysis
  - Basic magnetism concepts
  - Basic magnetic applications
- ☐ **Topics that must not be included in the competition are:**
  - Semiconductors
  - AC circuit theory and devices
  - Capacitors
  - Inductors

### **Solar System (B)**

- ☐ This event will address the Sun, planets and their satellites, dwarf planets, comets, asteroids, the asteroid belt, meteoroids, Oort Cloud and Kuiper Belt.
- ☐ Virtually unchanged from last year except for a new topic from which questions will be chosen.
  - Interpretation of planetary and satellite surface and atmospheric features.

### **Technical Problem Solving (C)**

- ☐ Teams will be required to gather and process data to solve a given problem. Intermediate measurements and calculations may be required.
- ☐ Students will bring and use ANSI Z87 chemical splash goggles (#4).
- ☐ No other changes from last year.

### **Wind Power (C)** *(Formerly known as Physical Science Lab)*

- ☐ Teams will build a blade assembly that consists of any kind of propeller / pinwheel / rotor attached to a compact disc (CD), which will be used to capture wind power. Students will also be tested on their knowledge regarding alternative energy.
- ☐ This is an impound event.
- ☐ #2 ANSI Z87 Safety Spectacles with Side Shields are required during blade assembly testing.
- ☐ Event Parameters: mostly unchanged except:
  - There will be one or more load resistors (5 to 7.5 ohms) in parallel with the motor / generator (details to be announced after impound).
  - Probes to record voltage measurements across the resistors to be furnished by supervisor.

### **Wind Power (C) (cont.)**

- ☐ The motor/generator must be equipped with a spring-loaded type CD clip mount (like found on a portable CD player). It will have been removed from the player and mounted on a support rod.
- ☐ Maximum radial measurement of the blade assembly not to exceed 14 cm.
- ☐ No part of the blade assembly may extend behind the plane of the CD for at least 3 cm from the center.
- ☐ Between 3 cm and the 14 cm max radius, the blade assembly may not extend more than 2 cm behind the plane of the CD.

### **Wind Power (C) (cont'd.)**

- ☐ There is no limit to how far forward from the plane of the CD the blade assembly may extend.
- ☐ Competition:
  - There will be one or two test stations. If two, one for high speed and the other for low speed testing.
  - The supervisor may turn fans on or off during the set up period at the request of the students.
  - Blade assemblies may be modified during setup but not during testing.
  - During the one minute test, a computer or voltmeter that stores the maximum voltage will be used.
  - Teams may give their blade assembly a single tap to start it spinning when the test phase begins.
  - If two fans are used, (one for high speed, the other for low), all contestants must use both

### **Wind Power (C) (cont'd.)**

- ☐ Part II (written) part of the event will take 20-30 minutes and possible topics that may be covered are listed in your manual.
- ☐ Scoring:
  - Power output of the blade assembly will be calculated using either the mean voltage or if not available, the maximum voltage.
  - $\text{Power} = (\text{voltage})^2 / \text{load resistance}$
  - Part I raw score = low speed Power + high speed Power.
  - Part II raw score will be worth 50 points total.
  - Final score =  
50 X (Part I raw score / highest part I raw score) + part II score
  - Ties will be broken by highest high speed mean voltage (or max voltage) first and then by highest low speed mean voltage (or max).

### **Write it, Do it (B & C)**

- ☐ One student will write a description of an object and how to build it and then the other student will attempt to construct the object from this description.
- ☐ Almost no changes from last year's rules.
- ☐ Pay very close attention to the Competition and scoring sections of the rules, particularly paragraph "b" of the Competition.
- ☐ Use of diagrams or drawings will result in **disqualification**. 1% penalties will be assessed for each minor infraction (e.g. unlabeled abbreviations or improper use of editing symbols or codes).