

Compute This!

Steven J. Betza
National Event Supervisor
Lockheed Martin Corporation

(607) 761-7353
steven.betza@lmco.com

Today's Agenda

- **History of NSO Computing Events**
- **Compute This! - Rules Summary**
- **Rules Changes for 2011**
- **Sample Scoring Rubric**
- **Preparing a Team - Core Skills and Resources**
- **Common Challenges in Compute This! Exams**
- **Strategies for Success**
- **Sample Problems and Group Discussion**

History of NSO Computing Events

Computer Programming (Early 1990's)

- BASIC Language Programming
- 2-3 Design Problems per 50 Minute Competition

Surfing the Net (1998-1999)

- Rapid Information Search on World Wide Web
- 10-20 Short Answer Questions; Tiebreaker was Time

Using the Web (2001)

- "Logical Ordering" of WWW Content
- Single Research Topic; Highly Subjective Scoring; Discontinued After One Year

Compute This! (2002-2011)

- Combination of WWW Data Search and Graphical Presentation in Spreadsheet
- Objective Scoring with Pre-Defined Rubric
- Trial at 2002/2004 Nationals; "C" Event in 2003; "B/C" Event in 2005/2006
- Back in the Rotation at the "B" Level for 2009-2011
- Continuous Improvement of Rules (Pre-Announced Domain, Student Web Sites)

Compute This! - Rules Summary

- 50 Minute Event (5 Minute Orientation + 45 Minute Competition)
- Team of Up to 2 Students - One, Network Connected PC w/ WWW Access
- Problem Statement
 - Requires Information Search on WWW (Quantitative Data)
 - Spreadsheet Data Entry and Graphical Presentation
 - Up to 5 Additional Short Answer Questions - May Involve Analysis of Data Previously Captured or Additional Facts to Be Captured via Internet Search
- Data Submission
 - Spreadsheet File - Data Tables and Graphics
 - Document File - Answers to Short Answer Questions + URL's
 - Supervisor Will Specify if Files are to Be Saved, Printed, E-Mailed, etc.
- No Resource Materials or Calculators (Blank Scrap Paper is OK)
- Teams May Construct a Reference Web Site Prior to Competition
- Absolutely No External Communication during Event (E-Mail, Chat, etc.)

Rules Changes for 2011

Division B Changes (vs. 2011)

- New Topic for 2011 - Weather and Severe Storms
- All Required Information Will Be Located within the www.noaa.gov Domain
- Transition to "Open Office, MS-Compatible" Toolset vs. MS Office

Reminders / Common Questions

- Teams May Use Any Web Resource or Search Engine to Locate Data within the www.noaa.gov Domain (e.g. Google, Yahoo, Ask, Bing, etc.)
 - However, Immediate Disqualification for E-Mail or Chat Traffic
- URL's Associated with Short Answers Must Point to www.noaa.gov Domain
 - Zero Credit for Answers Found at www.harrysweatherfacts.com 😊

Compute This! - Sample Scoring Rubric

Completeness and Accuracy of Quantitative Data Collected (20 Pts.)

- Correct X and Y Axis Data Points in Data Table (n Pts. each)
- Correct Units of Measure (n Pts., if conversion required)

Completeness, Accuracy, and Format of Graphical Presentation (30 Pts.)

- Correct Graph Format (n Pts.)
- Title Above Graph (n Pts.)
- X-Axis Properly Labeled (n Pts.)
- Y-Axis Properly Labeled (n Pts.)
- Legend Exists (n Pts.)
- At Least One Data Point Plotted (n Pts. each)

Answers and URL's Associated with Short Answer Questions (50 Pts.)

- Correct Answers with Valid URL's (n Pts. each)

Tie Breakers are: (1) Short Answer Questions, (2) Quantitative Data Collected, and (3) Overall Graphical Quality. Time is not a Tie Breaker.

Preparing a Team - Core Skills

- **Efficient Use of WWW Browser and Search Engine (e.g. Google)**
 - Intelligent Selection of "Keywords" for Searches
 - Use of "Operators" to Narrow Searches (e.g. "and", "or", etc.)
 - Extraction of Numeric Data from Tables or Text (Manual Transcription)
 - Familiarity with www.nasa.gov Domain
 - Construction of (Non Password Protected) Team Web Site - Optional
- **Efficient Use of Spreadsheet Tools for Charting of Numeric Data**
 - Construction of Data Tables
 - Familiarity with Chart Types and Sub-Types
 - Proper Insertion of Titles, Axis Labels, and Legends
 - Follow Instructions Carefully in Problem Statement
- **Use of Word Processor for Short Answer Questions (Up to Five)**
 - Basic Word Processing (Advanced Features Not Required)
 - Data Entry of Short Answers... Complete Sentences Not Required
 - Ability to Copy & Paste Source URLs from Web Browser to Word Processor

Common Challenges in Compute This! Exams

(For "Oceans 11" Fans ☺)

- Multiple Web Searches Required to Find Quantitative Data ("Ferdinand Magellan")
- Quantitative Data Buried Deep in a Large Data Table ("Needle in a Haystack")
- Reading Required to Locate Quantitative Data or Short Answers ("Leo Tolstoy")
- Mathematical Calculation or a Conversion of Units Required ("Sir Issac Newton")
- Use of Calendars/Dates to Determine Age of People or Events ("Mayan Puzzle")

Mature, Unflappable Test-Takers are the Medalists in Compute This!
Student Constructed Web Sites Can Greatly Assist in Preparation

Coaching Hints - Strategies for Success

- **Conduct Tryouts Across a Broad Range of Students**
 - Don't Prejudge Success or Failure
 - This is as Much of a Quantitative Data (Math) Event as a Computing Event
 - In Division B, Student Maturity is a Key Factor (i.e. 8th and 9th Graders)
 - Note: Mastery of NOAA Subject Matter is Not a Pre-Requisite... the Ability Search & Graph WWW Data Is. Topical Familiarity Can Help, However.
- **Hold Structured Practice Sessions**
 - Develop Practice Problems in a Format Similar to Today's Examples
 - Conduct Practices in a Computing Lab, if Possible (Simulate Competition)
 - Expect 2-3 Hours of Coaching Prep for Each Hour of Team Practice
 - Idea: Spreadsheet-competent Parent or Math/Tech Instructor as Coach
- **Emphasize Neatness and Attention to Detail on Spreadsheet Graphics (i.e. Label Axes and Data Points, Use Correct Units of Measure, etc.)**
- **Develop a Time Budget and Role Sharing Strategy for the Team - The Objective is to Maximize Points Earned During a 50 Minute Competition**

Practice and Disciplined Time Management are Keys to Success!

Sample Problems

- **2004 National Tournament (B Division)**
 - Topic: Tsunamis (Five Pacific-Wide Historic Tsunamis)
 - Source: International Tsunami Information Center
 - Format: Column Chart (Maximum Wave Height, Year of Event)
 - Five Short Answer Questions (Several Two-Part Questions)
- **2004 National Tournament (C Division)**
 - Topic: Sunspots and Solar Flares
 - Source: National Geophysical Data Center
 - Format: 3D Line Graph (Sunspots and Solar Flares Over 10 Year Period)
 - Five Short Answer Questions (Several Two-Part Questions)
- **2005 National Tournament (B Division)**
 - Topic: Unmanned Lunar Space Missions by Former Soviet Union
 - Source: NASA Goddard Space Flight Center
 - Format: Lines on 2 Axes Chart (Mass of Spacecraft, Closest Dist. to Moon)
 - Five Short Answer Questions (All Two-Part Questions)

Note: 2004 and 2005 Sample Problems Provided to Illustrate Format of Event. 2011 Problems Will Relate to Weather and Severe Storms (www.noaa.gov).

Your Comments and Questions?