COACHES CLINIC

Virginia Science Olympiad

OCTOBER 22, 2011

Robinson Secondary School

Schedule

- 9:30-10am Overview
- 10-12pm New Events
  - 10-10:30 New Joint B & C Events
  - 10:30-11:30 Breakouts - B / C specific
  - 11:30-11:45 Meet the New Coaches
  - 11:45-12pm Q&A / Wrap up
- 12:00-2pm New Coaches Session (all welcome)
  - 12-12:30 Organizing & Managing aTeam
  - 12:30-1:30 "Old B & C Events" - 2010/11
  - 1:30-2pm Breakouts - B / C specific
  - 2pm Q&A / Wrap up

State of VASO

- Student/School Population Served
- Engaging Outside Expertise
  - VCU
  - FlyBoys
  - Rocketeers
  - Professionals in Subject Matter
- Technology/Process Improvements

What's New?
VASO 2011-2012

- Charlottesville/Richmond
- Teacher Sponsor/ Head Coach
- Event Writer Development
- VA-Specific Events/ Modifications

VASO 2011-2012 Timeline

- December 30, 2011:
  - Team registration/fee payment deadline
- February 18, 2011:
  - Longfellow Regional Tournament
- February 25, 2011:
  - Langley Regional Tournament
- March/April 2012:
  - State Tournament (date and location TBA)
  - Note: In the unlikely event of excessive registration or size restrictive tournament location, VASO will determine how to qualify teams for State Tournament.

Mission

- Mission Statement
- Team Experience
- Student Learning
- Providing the BEST Tournament Experience

Team Experience – Coaches Role

- What you SHOULD do:
  - Event Assignments
  - One point of contact btw VASO & School (or thru staff sponsor)
  - Provide structure, guidance, monitoring, ensure fairness
  - Set Expectations - students … *and also ES, MS parents!*
  - Reinforce Life Skills - Learning, Teamwork, Leadership, …
- What you CAN do:
  - Enlist outside aid (parents, teachers, "SME"s) to help guide students (some Elem schools require parent mentoring for their child's participation)

Team Expereince – Life Skills

- What you SHOULD do:
  - HELP them learn to structure their time
  - HELP them learn to find resources & matls for events, if needed
  - Allow it to be FUN
  - Reinforce what it means to *Compete Well*

- What you SHOULD NOT do:
  - Create binders, study guides, study sheets
  - Research for students
  - Design or build engineering devices

Student Learning

It's not just about Science!

- Field Trips & Parties
- Practice and Compete as a TEAM (not as groups of individuals)
- Team Building – Learning to work with others is a life skill.
- Reward Effort
  - MVP, Best Event Partner, Best Teammate, Best Substitute Event Partner, Future SO Coach…
  - Student suggested (& coach vetted!) Awards
- Suggestions ?

VASO Events 2011-2012

Virginia Science Olympiad –Events 2011/2012

Life, Personal & Social Science-5	Earth & Space Science-5	Physical Science & Chemistry-4	Technology & Engineering-5	Inquiry & Nature of Science-4
	Division B			
Anatomy *(Respiratory, Digestive)* Disease Detectives *(Food Borne Illness)* **Water Quality** **Forestry** Microbe Mission	Dynamic Planet *(Earth's Fresh Water)* Meteorology *(Climate)* **Reach for the Stars** Road Scholar **Rocks and Minerals**	Physics **Keep the Heat** Optics Storm the Castle Chemistry Science Crime Busters ~~Food Science~~	~~Bottle Rocket~~ **Mission Possible** Mousetrap Vehicle Towers Mystery Architecture RollerCoaster	**Awesome Aquifer (w/ expanded schedule for presentations)** ~~Compute This~~ Metric Mastery Experimental Design Write It Do It
Life, Personal & Social Science-5	Earth & Space Science-3	Physical Science & Chemistry-6	Technology & Engineering-4	Inquiry & Nature of Science-4
	Division C			
Anatomy & Physiology *(Respiratory, Excretory, Digestive)* Disease Detectives *(Food Borne Illness)* **Water Quality** **Forestry** Microbe Mission	Astronomy Dynamic Planet *(Earth's Fresh Water)* ~~Remote Sensing *(Human Impact)*~~ **Rocks and Minerals**	Physics **Thermodynamics** Optics Sounds of Music ?? Chemistry Chem Lab Forensics Protein Modeling	Helicopters **(w/ test portion)** **Robot Arm** Towers **Gravity Vehicle**	Experimental Design **Fermi Questions** Technical Problem Solving Write It Do It

Tournament Experience

- Competition Between Students
- Event Selection
- Event Judging
- Tournament Policy

Events Covered in the General Session

Joint B & C Events New for 2011-2012

- Rocks & Minerals (2009)
- Forestry (2005)
- Water Quality (2005C, 2006B)
- Thermodynamics [C] / Keep the Heat [B] (1995?)

New & Modified Events B

Breakout 1: New/Modified B

- Metric Mastery (2008)
- Reach for the Stars
- Mystery Architecture (2008) (+ modifed Aquifers schedule)
- Mission Possible
- Mousetrap Vehicle
- Rollercoaster ** new VASO event **

Breakout 2: New/Modified C

- Helicopter
- Robot Arm
- Fermi Questions
- Gravity Vehicle
- Protein Modeling - modified

New Coaches Session

- Ideas for Organizing and Managing Your Team
- Resources/Samples/Examples
- 2011-2012 Events (also run in 2010-2011)

Any and All are Welcome to this Session

Coach Panelists: ES/MS: Barbara Back, Anita Sahai, Jenn Ezzell

HS: Leah Puhlick

ENG'G Events: Chris Ganley, Justine Cromer

Rocks & Minerals

- **Event Description:** A team of up to 2 will demonstrate knowledge of rocks and minerals (restricted to the Natl SO list, but VASO can add up to 5 with 3 weeks notice. (test: stations)

- **Key Preparation Tips** - (Not you!! THEM!)
  - Each team member prepares 10 (?) rocks every week
  - Study a variety of pictures & **SAMPLES** (buy/borrow Kit)
  - Develop a rock & mineral template for **BINDER** entries
    ** use list of **EVENT TOPICS** in rules **as a starting point**
    ** include a variety of pictures (incl your own)
  - Develop lots of charts, diagrams, and orderings

  - **PRACTICE, PRACTICE, PRACTICE**

Supplemental: EVENT TOPICS

- Specimen identification
- Rock cycle
- Properties of minerals
- Mineral groups
- Economic importance
- Formation & properties of igneous, sedimentary, metamorphic rocks
- Clues to past environments
- Composition and structure of minerals
- Bowen's reaction series

Key Challenges

- Preparation:
  - Being able to identify specimens
    - Follow on ?s: for this rock, what role does it play….
    - Same rock may come in a variety of colors
  - *Speed* using the Binder
    - Organization is key - Tabs and colored handouts help
  - Make it FUN!
- Tournament Day:
  - Talk quietly (the competition may be listening)
  - If a station is left unfinished, take notes & try finish later
  - Possible disqualification if you mix up

Supplemental: Arranging/Ordering Specimens

Students can practice by arranging specimens (or flashcards with pictures)

- By hardness (may use scratch plates, nails, or pennies)
- By metamorphic grade
- By sedimentary grade
- In groups
  - By composition
  - By crystal structure
  - By origin
  - By economic use

Supplemental: Charts & Diagrams

Charts: Physical properties, origins, economic uses, etc.

Diagrams: (examples)

- Igneous features - Batholiths, dikes, sills, etc.
- Metamorphic features
  - regional vs. contact metamorphism
  - temperature/pressure graph
- Sedimentary features
  - large scale – formations, strata
  - small scale – cross bedding, ripple marks, etc.

Supplemental: SAMPLES

- Museums ** Smithsonian Natural History **
- Local colleges or universities (geology or education departments) ** James Madison **
- Local rockhound societies or individuals
  - November 12-13 Show @GMU www.novamineralclub.org (next one this close by is mid March)
  - Buy samples, go to "Quiz Sites", ask for help id'ing a rock, etc.
  - Caveat: Private collections - ID can be wrong
- State Geological Surveys

Supplemental: RESOURCES

- Rock & Mineral Guide
  - Try several to see what the students like
  - Use pictures from multiple guides in binder
- Suggestions
  - National Audubon Society Field Guide to North American Rocks and Minerals
  - Smithsonian Handbooks: Rocks & Minerals
  - A Field Guide to Rocks and Minerals (Peterson Field Guides)

Supplemental: RESOURCES

- Quick Study BarChart: Rocks & Minerals
- Possible Texts - Aim for high school or freshman college level
  - Putnam's Geology by Birkeland & Larson
  - The Earth Through Time by Harold Levin
    - Online Student Companion Site
    - http://bcs.wiley.com/he-bcs/Books?action=chapter&bcsId=5239&itemId=0470387742&chapterId=53053
  - Understanding Earth by Press & Siever
    - Online Student Companion Site
  - Exercises in Physical Geology by Hamblin & Howard

Forestry

- Teams of 2
- Complete test or stations with tree identification and questions about trees and forestry

Forestry – Event Parameters

Students may bring :

- one 8.5 x 11 double sided page of notes
- 2 commercially published field guides
- 1 copy of the official tree list

And…they can write on any of these

Forestry - tips

- Get out now and collect specimens!
- Have students practice using the guides to identifiy leaves, pinecones, berries, bark, etc.
- Develop a dichotomous key to assist with identification
- Genius and species names must be given – common names will not be accepted

Water Quality

- Teams of 2
- Earth's freshwater (rivers and lakes)

Water Quality – Event Parameters

Students may bring :

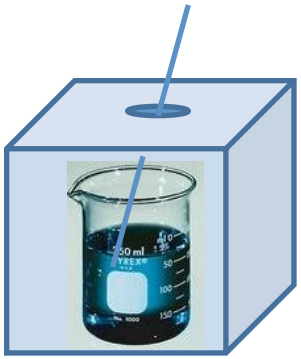
- one 8.5 x 11 double sided page of notes
- 2 non-programmable calculators
- Chemical splash goggles
- A homemade salinometer/hydrometer capable of measuring saltwater concentrations between 1-10%

Water Quality – Event Parameters

3 part event:

- A test section on aquatic ecology and chemistry
- A test/identification section on macro-flora and fauna (list of organisms is given in rules)
- A lab-based section on water monitoring and analysis with actual testing using the homemade hydrometer

Thermodynamics



EVENT DESCRIPTION

This event is in two parts:

I. Test a device prior to the tournament that is designed to minimize energy transfers to the surroundings.

II. Complete a written test on thermodynamic concepts

KEY DESIGN CHALLENGES—PART I

- The device must fit within a 20.0cm x 20.0cm x 20.0 cm
- Only allowed materials: wood, paper, cardboard, natural fibers, organic granular materials, aluminum foil, fastening materials
  - –NO FOAM, PLASTIC. BUBBLEWRAP, GLASS, COMMERCIAL INSULATION
- Must be able to insert and remove a 250mL standard, unaltered, empty Pyrex beaker
- Must also accommodate insertion and removal of thermometer into beaker via a hole at least 1.5cm in diameter directly above beaker.
- Must calibrate their device prior to competition by preparing up to 4 plots showing the relationship between elapsed cooling time and ending water temperature for various quantities of water and starting water temperatures.

KEY PREPARATION CHALLENGES—PART II

- Topics may include (but not limited to): temperature conversions, definitions of heat units, thermal conductivity, heat capacity, specific heat, laws of thermodynamics, history of thermodynamics (caloric theory?), thermodynamic processes

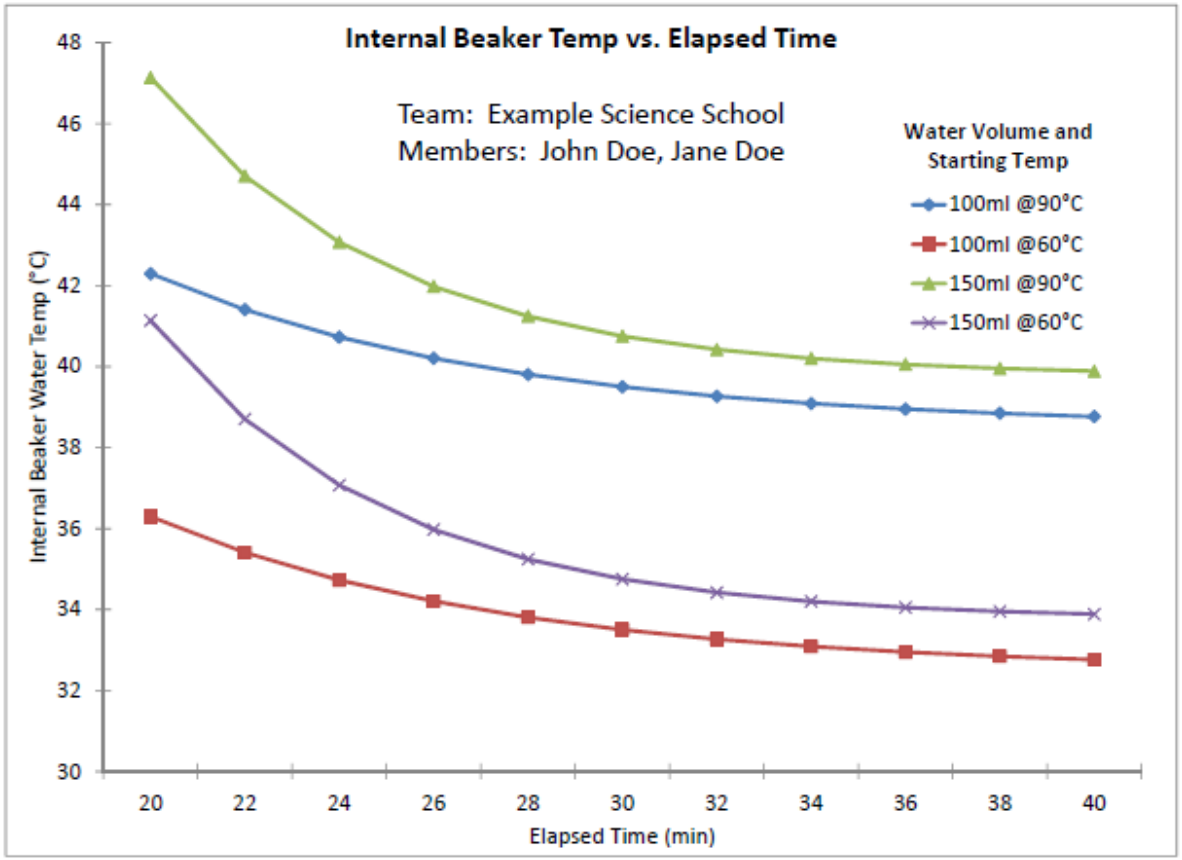
SCORING

- Test Score=Max of 50 points
- Plot Score= Max 10 points (duplicate copies: one for judges, one for team)
- Heat retention Score: Max=50 points
- Prediction Score: Max=25 points
- Ice Water Bonus=Max 12.5 points

KEY TOURNAMENT DAY CHALLENGES

- Water will be anywhere between 60°C-90°C
- Volume of water to be used (50 to 150mL in 25 mL increments at regionals, 10mL increments at States)
- Amount of cooling time is anywhere between 20 to 40 minutes.

Example Plots



Resources

- http://www.soinc.org/thermodynamics_c

SCIENCE OLYMPIAD

Exploring the World of Science

SUPPLEMENTAL INFORMATION

- Teams may elect to add **up to 100ML** of ice water to their devices immediately after receiving the hot water from the judges for up to 12.5 bonus points (=volume of ice water received/8)
- Students must predict the final temperature of their water given its initial temperature (same for all teams) and cooling team (same for all teams). The better their prediction, the better their prediction score.