

Marsh White Award Report

Event Title: Science Olympics

Event Date: December, 2005

Chapter: Embry-Riddle Aeronautical University, Prescott Campus Chapter #1801

Abstract: Local middle schools will prepare teams of four students, one from the seventh grade and one from the eighth, to participate in a day-long competition on campus. The competition will consist of many events emphasizing teamwork and problem-solving skills, and various fields of scientific study, from geology to zoology to astronomy. The teams will spend the months preceding the competition preparing for the events by studying with teachers and volunteer college students.

Participants: Eight students per participating middle school (four seventh graders and four eighth graders), one to two college volunteers per school, 2-3 student volunteers for each event (to ensure impartiality, these must not be the same volunteers who worked with the teams), minimum one teacher per school.

Funds: (proposed)

Costs	
Item	Cost
General Materials	
Poster Materials (cardboard, markers, etc.)	\$75.00
Transportation (fuel expenses)	\$300.00
“Office Supplies” (paper, pencils, pens, etc.)	\$75.00
Event-Specific Materials	
Water Balloon Catapult (water balloons, catapult)	\$70.00
Back Woods Science (paper for signs)	\$20.00
Black Light Night (stars, black paper)	\$30.00
Jeopardy Scavenger Hunt (chemical supplies, paper and pencils)	\$40.00
Lego TM Communication (Legos TM)	\$40.00
Egg Drop (eggs, straws, tape)	\$20.00
Paper Airplane Races (paper, supplies)	\$20.00
Total Costs	\$690.00
Income	
Marsh White Award	\$300.00
Fundraisers	\$390.00
Total Income	\$690.00

Rules and Documentation: The following are a copy of the rules and the principal letter to be distributed to participating schools, as written by project coordinator Renee Naphas.

Science Olympics Event Procedures and Rules:

Overall Rules

Participants: Each school is allowed to enter two teams of four from seventh and eighth grade. All team members must be in the same grade, as there will be a separate competition and awards for each grade. How team members are chosen will be at the discretion of each school.

Events: All events will be held on Embry-Riddle's campus on a single day, which is yet to be determined (December 2005). Individual event rules and procedures are listed below. Each event will have an "Event Coordinator", a single person who is in charge of running the event. He or she will have the final word in any disputes. There will also be "Event Assistants" who will help coordinate the event. Each team must participate in all events. A few events will be held at the same time; the day's schedule is attached.

Scoring: For each event there will be a first, second and third place winner. First place will receive 5 points, second place; 3 points, and third place; 1 point. There is one exception, the Scavenger Hunt is the only full team event and therefore will be worth more points: first place will receive; 7 points, second; 5 points and third place; 3 points. There will be no ties in event placement: each event has an outlined method of breaking ties. There will be an overall first, second and third place based on the sum of each team's event points. In the event of a tie for overall, the final overall placement will be based on the placement of the teams in the Scavenger Hunt event.

Award Ceremony: All winners will be announced at the award ceremony at the end of the day. Event winners will be awarded a medal and prizes that will either be donated or purchased from local businesses, ex: pizza or mini-golf. The overall winners will receive a larger medal and the premier prize.

Disqualification (DQ): There will be three types of disqualification: attempt, event and competition. Each event has its own guidelines concerning each type of DQ.

Attempt DQ: When a team is DQed from an attempt they are still allowed to compete in the event, but their attempt will not be counted. ex: In the Airplane Races, each team will be given 3 attempts. If on one of these attempts the person throwing the airplane steps over the line, that attempt will not be judged and they will not be allowed to repeat the attempt.

Event DQ: If a team is DQed from an entire event they are still eligible for the overall competition. Ex: If a team shows up to any event late they will not be allowed to compete in that event. However they will still be allowed to compete in other events and be eligible to win an overall medal.

Competition DQ: If any team is caught cheating in any event, (even if the event only involves two members of the team) the entire team will be removed immediately. None of their scores will be counted in any previous events and they will not be allowed to compete in any more events. It will be as though their team was never there, and the event places will be adjusted accordingly.

Water Balloon Catapult

Number of participants: Two from each team.

Practice: Each team will have only one practice launch.

Time: This event is not timed.

Set Up: A catapult will be secured to the ground at the edge of a field. In the field there will be a target a set distance away (The students will be told this distance at the start of the event). A tub of pre-filled water balloons will be provided from which the teams will choose their ammunition.

Procedure: Only the trajectory and force of the catapult can be changed. The teams will all be given a single practice launch, because the purpose of this event is for the teams to use their calculations and not just guessing to solve for the most accurate settings. Each team will be given three consecutive attempts. Teams will not be allowed to watch,

or receive any information concerning, other teams' attempts, until after they have completed their attempts. Each team must wait until the Event Coordinator gives them the 'all clear' to fire.

Allowable resources:

A non programmable calculator.

A blank piece of paper and a pencil or pen.

Scoring: The distance from the center of the target to the point where the water balloon from each attempt hit the ground will be recorded. The sum of all three attempts will be the team's score. The team with the lowest score wins first place.

Attempt DQ: Firing before the Event Coordinator allows them to fire.

Event DQ:

Getting help from spectators (Team that have completed their attempts and students not involved in the event will be allowed to watch from a safe distance, however they must not give any help to those competing)

Competition DQ:

Moving the catapult

Moving the target

Using anything not listed in the "allowable resources" i.e. cheat sheets

Back Woods Science:

In this event teams will have to name rocks, plants and animals found in Arizona and answer questions about them as well. This event combines geology, botany and zoology and helps students gain a better understanding of the world around them.

Number of participants: Two from each team.

Set Up: Marked path through outdoor area. Numbered items along the path will be referenced by questions on a list.

Allowable resources: A question list, a blank piece of paper, and a pencil or pen.

Scoring: Most correct answers wins, ties decided by time in event.

Competition DQ: Using anything not listed in the "allowable resources" i.e. cheat sheets. Tampering with the event setup.

Black Light Night:

The ceiling of a room will be covered in glow-in-the-dark stars replicating the night sky and illuminated by black lights. Each team will earn points by naming constellations and answering questions about the universe.

Number of participants: Two from each team.

Set Up: Numbered constellations in fluorescent material on the ceiling of one room. Posters of various astronomical objects in a second room with a question list corresponding to them.

Allowable resources: A question list, a blank piece of paper, and a pencil or pen.

Scoring: Number of correct responses, with ties decided by time in event.

Competition DQ: Using anything not listed in the "allowable resources" i.e. cheat sheets. Tampering with the event setup.

Jeopardy Scavenger Hunt:

This event will combine several seemingly unrelated fields: map reading, mathematics, code breaking, and chemistry. Each team will be given a map of the campus and a mathematical clue, which when solved will give them the number of a building in which they will find the next check point. At each check point they will have to answer a chemistry question before they are given a piece of a code and a clue to find the next checkpoint. The team

that collects all of the pieces of code from each checkpoint and break it will win. This event shows how teams work together in real industry; each member has a specialty and they must all work together to be successful.
Number of participants: The whole team.

Set Up: A question bank in each of a number of checkpoints around campus. Each checkpoint has a clue to the code. One map per team.

Procedure: Answer verbal questions on random topics until one is correct, and then receive a mathematical result question that gives a destination building and a piece of code. Repeat at destination building. Repeat until the message is readable.

Allowable resources: A map, a blank piece of paper, and a pencil or pen.

Scoring: Time decides the score.

Competition DQ: Using anything not listed in the “allowable resources” i.e. cheat sheets. No outside assistance.

Lego Communication:

This event is designed to promote the importance of clear communication. One team member will be given a simple structure built out of Legos and he or she will have to write out instructions on how to build the structure. Then another member will have to follow the instructions to reproduce the original structure.

Number of participants: Two from each team.

Time: 20 minutes to write instructions, 20 minutes to build the structure.

Set Up: One structure per team (equal complexity). Extraneous parts for each team. .

Procedure: One team member writes instructions on how to build the structure (no drawings allowed). The other then attempts to build it using the instructions.

Allowable resources: A blank piece of paper and a pencil or pen.

Scoring: The team with the most accurately placed pieces wins. Ties are decided by the lowest combined time.

Competition DQ: Using anything not listed in the “allowable resources” i.e. cheat sheets.

Egg Drop:

Each team will be given a set number of straws and length of tape with which to build a protective casing around an egg. Then each assembly will be dropped from higher and higher platforms until it breaks. This event is much like a crash test performed by mechanical, automotive, or aeronautical engineers.

Number of participants: Two from each team.

Set Up: Straws, tape, and various other materials of set quantities for each team. Only one egg per team (no replacements!).

Allowable resources: A blank piece of paper and a pencil or pen.

Scoring: Highest successful drop wins. Ties decided by 5 minute build-off with remaining supplies; highest place of the tied heights is the highest available.

Event DQ: If any egg is broken prior to the drop test.

Competition DQ: Using anything not listed in the “allowable resources” i.e. cheat sheets. Sabotage.

Paper Airplane Races:

This aeronautical event will be broken into two parts: time and distance. Each team will be given paper and a few random things, i.e. paperclips, with which to make paper airplanes. Each team will earn points based on how long their planes stay in the air first. Then they will be judged by the distance traveled.

Number of participants: Two from each team.

Set Up: Paper, paperclips, and other miscellaneous materials.

Allowable resources: A blank piece of paper and a pencil or pen.

Scoring: 50% based on time aloft, 50% based on distance traveled along launch line.

Attempt DQ: Release point beyond legal limit.

Competition DQ: Using anything not listed in the "allowable resources" i.e. cheat sheets. Sabotage.

Science Olympics Proposal Letter for Participating Schools:

To Whom It May Concern:

While children enjoy science when they are younger they often lose interest as they grow older. By brushing off the sciences many students close the doors on some extraordinary career possibilities. Even if students do not choose to study a science in college they can gain problem solving skills that are applicable to everyday life by studying it in school.

I would love to include your school in a program I am developing to peak the interests of 7th and 8th grades in the sciences. My name is Renee Naphas and I am the President of Society of Physics Students (SPS) at Embry-Riddle Aeronautical University. I have developed a program, actually a competition between area schools with the help of the physics department, other students and other similar programs. We are, of course, a non-profit organization and therefore everything will be provided free of any charges. In fact SPS will be raising all necessary funds as a community service project.

This competition will be held in December of 2005 on the Embry-Riddle campus and will consist of several events that will require students to have knowledge of several areas of sciences. These events will not be tests but rather hands on activities. Students will use the knowledge they gain from practices and studying along with their creativity and ingenuity to construct, destroy, solve puzzles, and test their own creations. Every event will be very safe and moderated by adults and college students. Many events are based on a single field of science while a few events will combine different areas to teach that it is possible and even necessary to learn more than a single concentration and to work together as a group.

Water Balloon Catapult:

This event tests their knowledge of physics because each team will need to solve for the proper trajectory and weight necessary to hit a target a set distance away.

Back Woods Science:

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Each school will be allowed to enter two teams of four from each grade level. All events, with the exception of the Scavenger Hunt, will involve only two members of the team. See the attached "Procedures and Rules" for a complete explanation of all events. SPS will provide two of its members as liaisons and tutors to each school involved. These liaisons will help your school's teams study, practice building and provide practice questions that will be similar to those used in the actual events. I suggest that you find a designated science teacher to be your school's contact person who is willing to spend some extra time after school to help students prepare for the competition. I'm positive that the reward of seeing the students' interest and excitement in the sciences grow will make the extra work well worth the effort.

I am interested in uniting area schools to promote some educationally centered competition in hopes to fuel the dreams of those interested in the sciences, and perhaps open a few doors for those who have not discovered their own strengths. If you are interested in this program or have more questions I would be thrilled to talk to you. I understand that different schools may teach different areas of science and therefore some teams may have learned what they need to know for events in class when other will not. It is my goal to focus all questions around extra-curricular study, but at the same time not exceed to capabilities of the students. In order to do this I will need some help from the science teachers of each school. I would like to get a syllabus and text book from each class so that we can better understand where the students are academically. I am planning on having a meeting with all of the principals, teachers working with the program, and student liaisons to go over all rules and to discuss the difficulty level of the questions early in the school year. Please include your school's schedule and the best times for you and your selected science teacher so that I can find a time that is convenient for all of those involved. I hope to hear from you soon.

Sincerely,
Renee Naphas