Coach Seminar

Elementary Science Olympiad 2017-18
Rithvik Ramesh

26 teams

Teams

- Bella Vista – 5
- Quail Run– 5
- Montair - 5
- Live Oak – 4
- Coyote Creek - 4
- Hidden Hills - 1
- Bollinger Canyon -1
- Fairlands - 1

Events

- Battery Buggy
- Rubber Band Catapult
- Energy Box
- Science Jeopardy
- Ecology
- Reach For The Stars
- Triathlon

Battery Buggy

Build Event

Description

Teams construct a vehicle that uses electrical energy to travel a certain distance.

Number of Participants: 2

Approximate Time: 45 min

The Competition

1. Competitors must design and construct a vehicle prior to competition that will travel 10.0 meters in a straight line.
2. Electrical energy used within the vehicle for any purpose must be stored in commercially available batteries labeled with their voltage by the manufacturer. The vehicle must use no more than 4 individual cells (labeled 1.5 volts or less each) or one single battery pack (labeled 4.8 volts or less). Batteries need not be installed until immediately prior to the run.
3. Components may be purchased or made by the competitors. (ex.: motors, gears, chassis, etc.). List of materials should be in Build Binder.

The Competition (cont.)

1. The entire vehicle must fit within a 30 cm. x 30 cm. space when in ready to run configuration. There is no limit on the height of the vehicle.
2. Competitors must start the vehicle by actuating a switch using a pen, pencil, dowel, or similar device (provided by Event Officials). 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 and will lead to a penalty.
3. 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 1 cm of the track surface. All distance measurements will be based on the fixed point.
4. The wheels must be the only parts of the Battery Buggy that contact the floor.

Scoring

- Each Run Score is the sum of 2 Components: The Distance Score and the Time Score. The distance score is the distance from the fixed point to the Final Point in millimeters. The Time Score is 25 times the official run time measured in seconds. Teams will be allowed 2 runs, the better score will be used.
- A maximum of 50 points can be awarded for a neat and well documented Build Binder.

Rubber Band Catapult

Build Event

Description

A team of two (2) students will design and construct a catapult device to shoot a rubber band at a target that is placed within a given range. Devices will be constructed prior to the competition.

Number of Participants: 2

Approximate Time: 45 minutes

The Competition

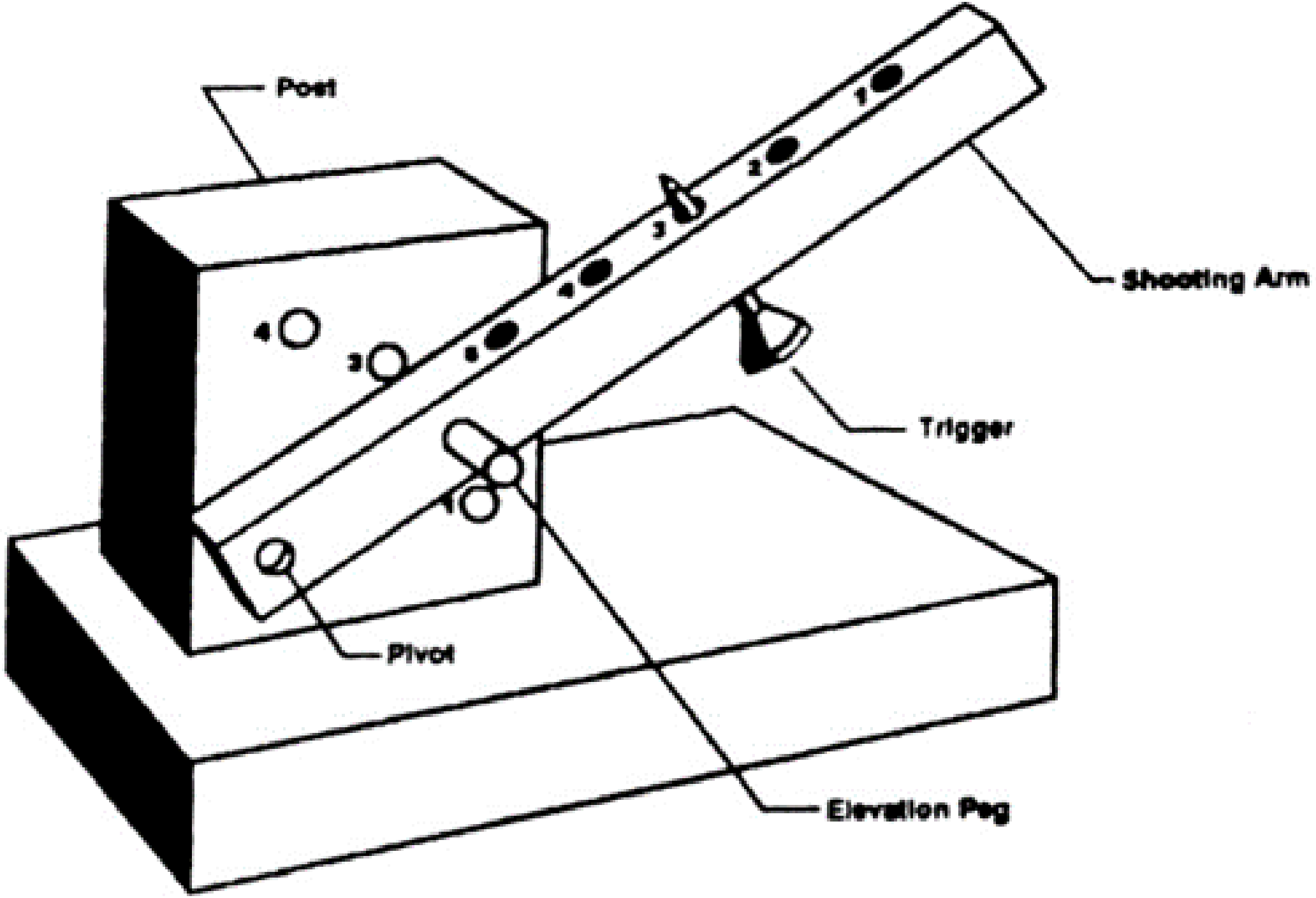
1. Students are to design, construct, and bring to the tournament a catapult device.
2. Catapults are NOT limited to the above design but must fit in an imaginary box with dimensions 70 cm x 70 cm x 70 cm and made of no construction grade material, with as few or as many shooting positions as needed to hit a target.
3. Evidence should be collected and presented on a data table which includes the base positions, shooting arm positions, and the distances traveled.

The Competition (cont.)

4. The target consists of three to twenty concentric rings with a dot at their center. The smallest ring is approximately 8cm in diameter with approximately 5 cm between rings. The center dot is approximately 2 cm in diameter. The center of the target will be locate between four and ten meters from the starting line.
5. No part of the catapult may extend beyond the starting line.
6. Contestants will shoot three times. They can use different bands on each shot.
7. Rubber band maximum size limit: 15 cm. (length, not circumference), measured with the rubber band suspended freely, under only its own weight, from a nail or similar object. Rubber bands may not be knotted, linked together, or attached to any other material.

The Competition (cont.)

- Teams must submit a Data Table to the event supervisor as part of the Rubber Band Catapult Build Binder which must contain a information of the base positions, shooting arm positions, and the distances traveled.


Post
Shooting Arm
Trigger
Pivot
Elevation Peg

10 meters

Scoring

- The score for each shot will be determine by the smallest ring (highest number) any part of the rubber band is touching or inside of when it comes to rest. The smallest ring is worth twenty (20) points, with each successively larger ring worth 1 less point.
- In addition to the 20 points for the smallest ring, an "X" will be awarded for all shots where any part of the rubber band is touching or within the center dot.
- The final score will be equal to the sum of the numerical scores for all three shots.
- The greatest number of points determines the winner.
- Ties will be broken in favor of the team with: first, the most Xs; second, the most twenties (20), continuing with nineteens (19) through ones (1). Any remaining ties will be broken in the same manner comparing each shot, 1st through 3rd, in order.
- A maximum of 50 points can be awarded for the Rubber Band Catapult Build Binder, which must contain a data table of the base positions, shooting arm positions, and the distances traveled.

Energy Box

Build Event

Description

Teams will construct, ahead of time, an insulated house-like structure no larger than 40 cm on a side (outside dimensions) to house and retain the heat of approximately 75 mL of water in a standard, empty, 100 mL glass beaker. (approx. 72 mm height cylinder with 55 mm diameter).

Number of Participants: 2

Approximate Time: 45 min

The Competition

1. Only one Energy Box is allowed per team. The judges will load them at thirty second time intervals until all of the competing boxes have their hot water samples. Judges will use water taken from a constant temperature bath such as an electric coffee pot.
2. There must be easy access to the energy box interior for easy loading or pouring and rapid measurement of the water sample temperature at the end of the competition period. Beakers may not be permanently installed in the Energy Boxes.
3. At the end of a 30 minute time period, energy boxes will be opened in the same order in which they were loaded by the judges, at thirty second intervals. Temperature measurements will be taken and recorded immediately by the judges.

Scoring

- Scoring will be based on the formula: score = $M \times \Delta T$ (where M = mass of box and ΔT = change in temperature). A maximum of 50 points can be awarded for a complete and well documented Build Binder.
- In case of a tie, the team with the smallest ΔT will be declared the winner.
- Winning energy boxes will be inspected to ensure that no other source of energy was used other than the hot water supplied by the judge. A list of materials used in the Energy Box is to be provided by the team in the Energy Box Build Binder.

Ecology

Theory Event

Description

Students will answer questions involving content knowledge and process skills in the area of ecology in test format.

Number of Participants: 2

Time : 45 minutes

The Competition

Topics of biology in 4^{th}/5^{th} grade textbooks will be covered in addition to the following advanced topics:

- Energy Flow (Pyramid)
- Symbiotic Relationships
- Cycles (Water, Carbon, Nitrogen)
- Population growth (Exponential/Logistic growth, Carrying Capacity, know how to read a population graph)
- Food chains/ Food webs
- Community interactions in general

Scoring

Questions will be assigned point values dependent on question difficulty. Students will be ranked from highest to lowest score. Ties will be broken with predetermined tiebreaker questions.

Some Resources

- http://nationalgeographic.org/activity/ecological-relationships/
- http://www.biology4kids.com/files/studies_relationships.html
- https://www.youtube.com/watch?v=z9TIlM96lT8&list=PLhz12vamHOnZv8kM6Xo6AbluwIIVpulio
- http://kids.nceas.ucsb.edu/
- Dorling Kindersley Ecology

Reach For The Stars

Theory Event

Description

Students will answer questions involving content knowledge and process skills in the areas of meteorology and astronomy in test format.

Number of Participants: 2

Time : 45 minutes

The Competition

Topics of meteorology and astronomy in 4^{th}/5^{th} grade textbooks will be covered in addition to the following advanced topics:

- HR Diagrams (know what they are and what they show)
- Important constellations and stars
- Famous scientists who made advances in these fields
- Natural Phenomena and Disasters
- Weather Patterns
- Atmosphere and layers

Scoring

Questions will be assigned point values dependent on question difficulty. Students will be ranked from highest to lowest score. Ties will be broken with predetermined tiebreaker questions.

Some Resources

- https://www.youtube.com/watch?v=8LfD_EKze2M&list=PLhz12vamHOnYmvLSYtQvuxDrWSi795yDa (only some of the videos)
- http://www.weatherwizkids.com/weather-forecasting.htm
- http://eo.ucar.edu/webweather/
- Dorling Kindersley Astronomy

Science Jeopardy

Theory Event

Description

The nature of the game is to choose a category and a level of difficulty from the game board and view and listen to an answer to a question. The first team to respond with an appropriate question for the answer will be awarded the specific number of points and will choose the next topic and level. Please view Jeopardy! episodes to get a better idea of how this works.

Number of Participants: 2

Approximate Time:
Prelims – 45 min
Final – 60 min

The Competition

1. A preliminary written test on general science will take place among all the teams (2 members from each team). The 3 highest teams in that written test will be selected to participate in the final round of Science Jeopardy.
2. In Science Jeopardy, there are 5 categories of answers with values from 100 to 500. Difficulty of questions should increase with the point values.
3. A category and point value will be chosen from the game board and the answer revealed. The event supervisor will present the answer on a projector so that all the teams can see it at the same time and read the answer.

The Competition (cont.)

1. The first team to respond must provide the correct question. If it is not correct, the other teams then have a chance to provide the correct question.
2. After the first two rounds, Final Jeopardy will be played. In this round, there is only one question and the teams can choose how many points they wish to wager. If they answer correctly they gain the wagered points, if they answer incorrectly, they will lose the wagered points.

Scoring

The team with the highest score wins. Ties will be broken by asking a tiebreaker set of 3 questions. The team that answers more questions correctly faster than the other team will break the tie.

Some Resources

- http://www.sciencefun.org/kidszone/trivia/
- http://www.timeforkids.com/homework-helper/study-helper/famous-inventors
- Jeopardy Labs is a website that has many jeopardy style questions. A simple Google search for "Science Jeopardy" will return many results.
- Quizlet is yet another great resource for jeopardy questions.
- Dorling Kindersley books are highly recommended.
  - Ecology, Rocks, Inventors, etc.

The Test Resource

http://scioly.org/

Look at the "Test Exchange" Tab and review past years' test along with topics that may be related to the events. Keep in mind, THE RULES ARE NOT THE SAME.

Book Resources

- California Science: 002284378 7/4
- California Science: 002284379 5/5
- Earth Science: 013201274X
- Life Science: 0132012723
- Example Questions will be forwarded

Triathlon

Description

Three physical skills are interspersed with science questions in an obstacle course that will be run in relay race style.

Number of Participants: 6

Approximate Time : Dependent on team

The Competition

- 1) Appropriate athletic wear is advised (running shoes, etc.).
- 2) The physical activity will include such events as: a dash, dribbling a basketball between cones, a Frisbee accuracy throw, carrying a ball on a spoon, etc.
- 3) Two students will be placed at each position A, B, C.
- 4) Written General science questions will be answered by the students at tables A,B,C where students stop between the physical events. Questions should be answered as rapidly as possible to avoid a loss of time.
- 5) Each physical obstacle must be completed correctly before proceeding to the next station. Students will be given ever-decreasing levels of difficulty in these physical events so they are able to be successful.

Scoring

- The total team time to complete the event as well as the number of correct answers will be taken into account.
  - Speed rankings will be converted into points. (Fastest team is team 1 and so receives 1 point, team 2 gets 2 points, and so on).
  - The number of missed questions will be added to the team's points. (If team 1 missed 5 questions, their score is now 6).
- The team with the lowest score will be first place and the team with the highest score is last place.

Overall Scoring

Scoring

- The ranks of the team in all events will be added up.
- The team with the lowest score is first place, and the team with the highest score is last place.

Event Schedule

8:00 - 8:30	8:30 - 9:00	9:00 - 10:00	10:15 - 11:15	11:30 - 12:30	12:30 - 1:30	1:30 - 2:45	3:00 - 4:00	4:00 - 5:00	5:00 - 6:00
CHECK IN	WELCOMING	SCIENCE JEOPARDY PRELIMINARIES	ECOLOGY	REACH FOR THE STARS	LUNCH BREAK	TRIATHLON	SCIENCE JEOPARDY FINALS	BREAK	AWARDS
		BATTERY BUGGY M, C, L	ENERGY BOX M, C, L	RUBBER BAND CATAPULT M,C, L					
		ENERGY BOX B, Q, H, BC, F	RUBBER BAND CATAPULT B, Q, H, BC, F	BATTERY BUGGY B, Q, H, BC, F					
		BELLA VISTA	B1-B5						
		QUAIL RUN	Q1-Q5						
		MONTAIR	M1-M5						
		LIVE OAK	L1-L4						
		COYOTE CREEK	C1-C4						
		HIDDEN HILLS	H1						
		BOLLINGER CANYON	BC1						
		FAIRLANDS	F1						

Any Questions?