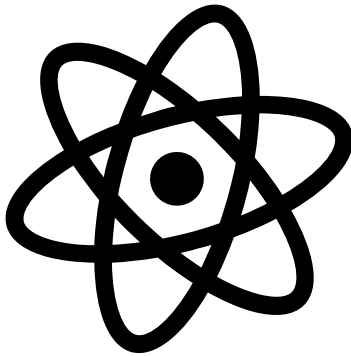


Science Olympiad

Division A

Saturday, March 12, 2022

Updated 10/1/21



Hosted by

San Joaquin County Office of Education

Science Olympiad Division A

2022 Events

A is for Anatomy	Orienteering
Barge Building	Paper Rockets
Bridge Building	Pasta Mobile
Chopper Challenge	Pentathlon
Crime Busters	Picture This
Dynamic Planet	Rockhound
Estimania	Starry, Starry, Night
Herpetology	Straw Egg Drop
Leaf Tree Finder	Water Rockets
Mystery Architecture	Write It/Do It

Please note that these events and their guidelines may change. Head coaches will receive email updates as they are available.

If you have any questions, please contact: Student Events 209-468-4866

The health, safety, and wellbeing of students, staff, and our communities remain top priorities of the San Joaquin County Office of Education (SJCOE) during the COVID-19 pandemic. The SJCOE works closely with our public health experts and will keep you informed should activities and events need to be modified, canceled, or postponed. This may include a change in dates, times, locations, and delivery methods (in-person vs. virtual).

Study/Build/Do and Sections 2022

Study

Build

Do

A is for Anatomy	Barge Building	Crime Busters
Dynamic Planet	Bridge Building	Estimania
Leaf Tree Finder	Chopper Challenge	Mystery Architecture
Herpetology	Straw Egg Drop	Orienteering
Rock Hound	Paper Rockets	Pentathlon
Starry, Starry, Night	Pasta Mobile	Picture This
	Water Rockets	Write It/Do It

Sections

(Don't put same student in two events listed in same section)

A is for Anatomy Barge Building Crime Busters Picture This	Bridge Building Dynamic Planet Estimania Starry, Starry, Night	Chopper Challenge Leaf Tree Finder Paper Rockets Pentathlon	Herpetology Orienteering Pasta Mobile Write It/Do It	Mystery Architecture Rockhound Straw Egg Drop Water Rockets
---	---	--	---	--

The health, safety, and wellbeing of students, staff, and our communities remain top priorities of the San Joaquin County Office of Education (SJCOE) during the COVID-19 pandemic. The SJCOE works closely with our public health experts and will keep you informed should activities and events need to be modified, canceled, or postponed. This may include a change in dates, times, locations, and delivery methods (in-person vs. virtual).

Event: A is for Anatomy

Description: This event will test students on their knowledge of both structure and function of the following systems: Nervous, Endocrine, Sense Organs.

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Each team may bring in only one 8.5 X 11" two sided page of information, in any form, from any source.

Event Managers: Event Managers will provide writing instruments.

The Competition: The test may include various formats such as: slides, stations, written answers, scantrons, multiple choice, etc. Students should be familiar with the **identified systems:**

Nervous

Endocrine

Sense Organs

Scoring: Each team will be given one answer sheet or scantron. High score wins, selected tie breaker questions and/or quality of free-response answers will be used to break ties. Selected tie breaker questions will be identified for students.

Possible Question/Station:

- What are the main functions of the nervous system?
- What are the sense organs and their functions?

Resources/Notes from EM:

B/C connection: Anatomy and Physiology

Event: Barge Building

Description: Teams will construct a barge using aluminum foil that can support a cargo of the largest number of objects without getting them wet. The cargo isn't announced until impound.

A Team Of Up To: 2 **Approximate Time:** 20 min **Impound:** YES/estimation **Visitors:** NO

Teams: Must go to impound to make their estimation on the number of "cargo" their barge will hold. Teams may bring their own calculator for estimation. The impound estimation is closed, meaning only students are allowed in the estimating room/area.

Event Managers: Will provide foil (brand not to be announced), water and cargo, writing instruments and score sheets.

The Competition:

1. Each team of two students will report to impound to estimate the number of "cargo" their barge will hold. Before students estimating, the event manager will give the average weight of each cargo piece.
2. Cargo pieces may be pennies, washers, paper clips, marbles, or other similar objects. The cargo will not be known until the time of competition immediately before estimation impound.
3. Each team will be given a 15 x 15 cm piece of aluminum foil.
4. Each team will be given 10 minutes to construct their barges and turn them into the supervisor. No other materials may be used in building the barge.
5. Each team will then be given 5 minutes to load their barges.
6. The piece that caused the barge to sink will not count in the total cargo. Sinking occurs when water enters the barge.
7. Each piece of cargo must be loaded one at a time while the barge is floating in pan/container of water.

Scoring:

1. The winner will be the team with the highest score.
2. The score will be determined by the following formula: # (of cargo held) x 10 – the difference between predicted amount and actual amount.
3. Example:
If a team predicts their barge will hold 70 and it sinks at 57, their score will be:
 $57 \times 10 - 13 = 557$
4. Ties will be broken by accuracy of the prediction.
5. If the event manager determines that a contestant intentionally sinks his boat at or near the predicted number, that team will be disqualified and receive participation points only.

Resources/Notes from EM:

Event: Bridge Building

Description: Teams will construct a strong, stable bridge from common materials.

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: May bring a pair of scissors. *Each student is also required to turn in their own journal, documenting trials, errors, photos, lessons learned in the process of building device.*

Event Managers: Will provide straws and tape for each team to build bridge. Straws can be any size (not announced), but will not be bendable. Tape will be 1 meter of masking tape of any size between 1/2 " and 1 " wide. Base to build bridge, 16 oz. solo cup and weights will also be provided. (Type of weight will be announced before competition on clarification page.)

The Competition:

1. Each team will be given 50 straws and 1 meter of masking tape to build bridge.
2. Each team will be given 25 minutes to build bridge.
3. The bridge may only be made using the provided straws and tape.
4. No parts of the bridge may touch the inside, bottom of the base provided. Bridge may touch all other parts of base (see picture provided.) Tape may not be used on any part of the base.
5. Bases will be required to stay on top of a table or desk. Tape and straws may not be touching desk/table. Students should be able to lift the bridge onto and off the base.
6. Each team will then be given 5 minutes to load their cups. Students will place the cup in the center of bridge and load weights.

Weighing

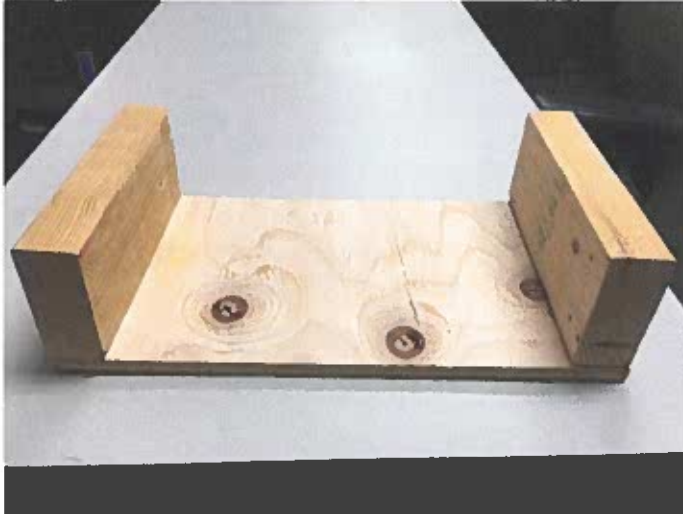
1. After construction teams will be given a plastic 16 oz. cup, weights and access to digital scale.
2. Teams will load cup with estimated number of weights that bridge will support and event manager will record weight.
3. Teams will transfer cup to center of their bridge. If bridge can hold weight for 3 seconds, EM will check the recorded weight as successful.
4. If the bridge does not hold the weight, the score will be 0.
5. If the bridge does hold the weight, the team will remove cup and add additional weights. The EM will record weight of 2nd attempt if the bridge holds new weight for 3 seconds.
6. If the bridge breaks, tips or does not hold the cup and weights for any reason, then the team's turn is concluded and the last accepted weight held will be recorded as final weight.
7. The piece that causes the bridge to break will not count in the total count of weights.
8. The unused portion of masking tape will be measured in case of a tie.

Scoring:

1. The winner will be the team with the highest cargo (number of weights.)
2. Ties will be broken by the longest amount of unused tape.

Resources/Notes from EM:

Provided base is $3 \frac{1}{4}$ " high on the inside with a 12" width on the inside. The length of one side is 8".
Translated to cm: 8.25 cm/inside, 30.5 cm width and 20.3 cm in length



B/C connection: Bridges

Event: Chopper Challenge

Description: Contestants will build and test 2 choppers using only the materials provided at the competition.

A Team Of Up To: 1-2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Teams may bring pencils, a ruler/straight edge and scissors. No other equipment/supplies are allowed. *Each student is also required to turn in their own journal, documenting trials, errors, photos, lessons learned, etc. in the process of building device.*

Event Managers: Will provide paper and paperclips.

Construction:

1. Each team will be given one 8.5 X 11" sheet of copy paper, one 8.5 X 11" sheet of cardstock paper and three paper clips to construct 2 choppers that use rotation to slow their descent.
2. Each chopper must be made using only the paper and paper clips provided by the event manager.
3. The choppers need not be the same size and shape.
4. Teams are allowed to have left over paper and/or paper clips.
5. Teams will be given 20 minutes to construct both choppers.

The Competition:

1. When it is their turn, contestants will drop each of their choppers, one at a time, from the height specified by the judges. All teams will release their choppers from the same height. Height will be determined by event manager and will be between 2-6 meters.
2. The judges will record the time it takes for each chopper to reach the ground/floor. Time will continue if the chopper bounces off an object, but will stop if the chopper gets stuck and stops.
3. This event may be held outdoors.

Scoring:

1. The team's score will be the sum of the flight times for both choppers. Longest total time wins.
2. Ties will be broken by comparing each team's single longest flight times.

Resources:

B/C connection: Helicopters

Event: Crime Busters

Description: Participants use tests to identify unknown powders, match fingerprints and use paper chromatography to identify a note found at a crime scene.

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Must bring lab coats or aprons, closed-toed shoes, chemical splash goggles and something to write with. Teams may bring an 8.5 x 11" two sided page of notes, in any form, from any source. Notes will be turned in.

Event Managers: Will provide all materials (including but not limited to: spot plates, small containers, plastic spoons, popsicle sticks or microspatulas, vinegar, iodine solution, water, hand lens, paper towels)

The Competition:

1. Teams will be supplied with the following materials to aid in the identification of the powders: water, vinegar, iodine solution (K13), a magnifying glass, and several plastic cups.
2. Teams will be asked to identify the following powders: granulated sugar, Plaster of Paris, salt, flour, cornstarch, baking soda, limestone and sand.
3. Tasting, touching or feeling of the substances, or unsafe handling of the equipment is NOT allowed.
4. No extra powder is provided, so students should practice with small amounts.
5. Some of the vials of powders will contain two powders. They will be identified by the event manager as "mixtures."
6. Students will be given a set of fingerprints from several suspects. They will be asked to match the fingerprints found at the scene, know the 3 basic types: loop, arch, whorl.
7. Student will need to perform simple chromatography and use results to help solve the crime.
8. Students will need to read a scenario for how the clues lead to a suspect.
9. After all the evidence is collected the students will be asked to identify who committed the crime and why they believe this is the criminal.
10. Students who do not have proper safety clothing or display proper safety behavior in lab will be disqualified.

Scoring: The score will be based on the following formula:

Identification of powders	50%
Chromatography	15%
Fingerprints	10%
Analysis, solving of crime	25%

Tiebreakers will be score of analysis first, completeness of notes second.

Resources/Notes from EM:

For practice, students may use calcium carbonate or take some chalk (don't use synthetic) and crush it, if limestone is not available.

Practice with several types of solvents and all types of pens.

B/C connection: Crime Busters and Can't Judge a Powder

Event: Dynamic Planet

Description: Students will learn about the Earth's Fresh Water

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Each team may bring in one set of two 8.5" x 11" double-sided pages of notes containing information from any source. Recommended that each participant bring in his/her own #2 pencil.

Event Managers: Will provide all necessary items, objects, materials, questions and response sheet for participants to complete the event.

The Competition:

Participants will be presented with one or more tasks requiring their knowledge and understanding of the Earth's fresh water from the following topics:

- a. Structure of the water molecule, and special properties of water including but not limited to: the interaction of molecules, density, states of matter, specific heat capacity of water, etc.
- b. The distribution of the quantities of all water on Earth including oceans, glaciers, ground water, lakes, rivers, and the atmosphere.
- c. The hydrologic cycle including evaporation, precipitation, condensation, transpiration, respiration, infiltration, run-off, percolation.
- d. Water as an influencer of climate
- e. Formation of rivers and features of rivers including but not limited to head waters, waterfalls, knickpoints, riffles, rapids, meanders, point bars, spurs, interlocking spurs, ox-bow lakes, levees, flood plains, banks, cut-offs, tributaries, distributaries, channel, mouth. When answering questions on River features, remember to use the F.E.E.D. system. (Feature, Explanation, Example, Diagram)
- f. River flow and effects including but not limited to discharge, capacity, competence, sorting (grading of sediments: rocks, pebbles, sand, silt, clay), load: solution, suspension, and bedload (traction, saltation) erosion and deposition, roundness of rocks
- g. Special rivers to know: Amazon, Congo, Ganges, Mississippi
- h. Types of lakes: by Carlson's Trophic Index: oligiotrophic, mesotrophic, eutrophic, hypereutrophic
- i. Structure of Lakes: determined by factors such as turbulence, temperature, water clarity, habitat size, and water depth. Thermal stratification layers: the Epilimnion, the thermocline (or Metalimnion), and the Hypolimnion. Another way to describe different zones that divide the water column from top to bottom and side to side are the Littoral Zone, Limnetic Zone, Profundal Zone, Euphotic Zone, and Benthic Zone.
- j. Formation and characteristics of specific lakes: Lake Baikal, Great Lakes, Lake Mead, Crater Lake
- k. Ground water: zone of saturation, water table, impermeable layer, subsidence, aquifer

Representative tasks:

- a. By examining and analyzing a picture or diagram, tell whether the landscape is erosional or depositional, age of a river, how a feature formed
- b. Describe the climate of 2 areas at same latitude, 1 near a body of water and the other not near.

Scoring: Scoring: High score wins. Points will be awarded for the quality and accuracy of responses. Ties will be broken by the accuracy and quality of answers to pre-selected questions.

Resources/Notes from EM:

Have students practice taking timed tests

B/C connection: Dynamic Planet

Event: Estimania

Description: Students will be asked to estimate the answers to approximately ten questions requiring an estimate between ten and one million.

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: No resources are allowed.

Event Managers: Will provide all relevant measuring tools for each station such as: rulers, measuring cups and calculators.

The Competition:

1. Teams will rotate through stations (approximately 7-12.) Each station will have 3-4 questions.
2. Students will be asked to estimate: Quantity, Length, Volume and Mass.
3. At each estimating station, students will be asked several questions of increasing difficulty.
Sample: How many kidney beans are in the jar?
 How many kidney beans would be in 8 jars?
 How many kidney beans would be in 1.5 jars?
4. If students are allowed to touch items at a station, a sample of the actual item will be next to question for students to touch/count/feel for comparison and estimation purposes.

Scoring: Scoring will be followed:

- 0-10% away from answer = 5 points
- 11-20% away from answer = 4 points
- 21-30 % away from answer = 3 points
- 31-40% away from answer = 2 points

High score wins. Ties will be broken by the answers to pre-selected questions chosen by the event leader.

Possible Question/Station:

The small wooden cube, provided, weights 6g.
How many wooden cubes could be used to fill this empty box?
If you filled the empty box with wooden cubes, what would be the mass of contents?
How would you write this number, using scientific notation?

Resources/Notes from EM:

Students should study: Scientific notation
 Conversions from metric units to metric units
 Be familiar with US to Metric chart below will be provided for those questions

Metric Conversion Estimates

Length

1 inch	2.5 centimeters
1 foot	30 centimeters
39 inches	1 meter
3.3 feet	1 meter
1 mile	1600 meters
1 mile	1.6 kilometers

Weight

1 ounce	28 grams
1 pound	450 grams
2.2 pounds	1 kg
1 ton	910 kilograms

Volume

1 pint	470 milliliters
1.1 quarts	1 liter
1 gallon	3.8 liters

Event: Leaf and Tree Finder

Description: This event will test teams on their knowledge of trees found in California.

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Each team is allowed to bring in one 3 ring binder of any size. The binder may contain: notes, charts, keys, filed guides and/or reference books as long as they fit into the 3 ring binder.

Event Managers: Will provide a hands-on event with all necessary items, objects, materials, questions, and response sheets for participants to complete stations.

The Competition: This event will be run in a station format. Teams will rotate through stations that assess teams knowledge of tree identification, classification system and uses from only the trees and shrubs found on the **Tree and Shrubs of California** list attached. Common names will be used.

Scoring: High score wins. Ties will be broken by the accuracy of quality of answers to pre-selected questions chosen by the event leader.

Possible Question/Station:

- A common use of the wood from this tree is:
- What elevation is the Giant Sequoia naturally found?
- What trees are used in making the back and front sides of acoustic guitars?
- Local Native Californian Yokuts used nuts from what tree to poison fish in small streams-
- A station may include a photo or the real leaf/seed pod and ask team to identify what type of tree it came from

Resources/Notes from EM:

See attached list

B/C Connection: Forestry

Sequoias and redwoods

- Coast Redwood
- Giant Sequoia

Pine trees

- Bishop Pine
- Coulter Pine
- Grey Pine - Digger Pine
- Foxtail Pine
- Knobcone Pine
- Ponderosa Pine
- Monterey Pine
- Limber Pine
- Jeffrey Pine
- Parry Pinyon
- Shore Pine
- Sugar Pine
- Torrey Pine
- Western White Pine
- Single-leaf Pinyon Pine
- Great Basin Bristlecone Pine

Other conifers

- Santa Lucia Fir
- Douglas-Fir
- Bigcone Douglas-Fir
- Incense Cedar
- Port Orford Cedar-Lawson Cypress
- White Fir
- Mountain Hemlock

Oak trees

- Valley Oak
- Leather Oak
- California Black Oak
- Canyon Live Oak
- Interior Live Oak
- Island Oak
- Engelmann Oak
- Coast Live Oak

http://en.wikipedia.org/wiki/California_native_plants

Other trees and tree-like shrubs

- California Sycamore
- White Alder
- Quaking Aspen
- Fremont Cottonwood
- Black Cottonwood
- Arroyo Willow
- Tanoak
- California Bay Laurel
- Madrone
- Toyon
- Bigleaf Maple
- Western Blue Elderberry
- California Buckeye
- Western Redbud
- California Black Walnut
- California Hazelnut

Common shrubs

- Chamise or greasewood
- Service-Berry
- Manzanita
- Coyote Brush
- California Lilacs
- Flannelbush
- Creosote Bush
- Lupines
- Snowberry
- Huckleberry
- Coffeeberry
- Lemonade Berry
- Sugarbush
- Gooseberries + Currants
- Sages

Desert plants

- California Fan Palm
- Joshua tree
- California Juniper
- Blue Palo Verde
- Yellow Foothill Palo Verde
- Single-leaf Pinyon
- Banana yucca
- Mojave yucca

Event: Herpetology

Description: This event will test students on their knowledge of **reptiles and amphibians**.

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Each team may bring in only **one** 8.5 X 11" two sided page of information, in any form, from any source.

Event Managers: Event Managers will provide writing instruments and tests. The test may include various formats such as: slides, stations, written answers, scantrons, multiple choice, etc.

The Competition:

1. Each team will be given an answer sheet on which they will record answers.
2. The event may include living and preserved specimens, skeletal materials and/or slides or pictures of specimens.
3. Both **Class Reptilia** and **Class Amphibia** specimens on the **2022 Herpetology List** will be used. Only specific sections of the **Class Reptilia** list will be used. Please consult the list on the following page.
4. Only **common names** will be used.
5. Teams will be asked to do basic identification and demonstrate knowledge of anatomy and physiology, reproduction, habitat characteristics, ecology, diet, behavior, conservation, sounds and biogeography.
6. The focus will be on reptiles and amphibians of North America.

Scoring: High score wins. Selected questions may be used as tie-breakers.

Possible Question/Station:

- Compare and contrast a crocodile with an alligator.
- Identify the order and family of the provided sample.
- Based on the dental structure of this organism, predict the type of food this organism eats.
- Is this organism native to North America or is it an introduced species? Where is it originally from?
- What makes this organism unique?

Resources/Notes from EM: These books are a good starting point but be sure to use all available resources.

National Audubon Society Field Guide to Reptiles and Amphibians North America – ISBN: 978-0-394-50824-5

Peterson Field Guide to Western Reptiles & Amphibians – Fourth Edition – ISBN: 978-1-328-71550-0

Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America–Fourth Edition – ISBN:978-0-544-12997-9

See provided handout with more information.

B/C connection: Herpetology

Herpetology List 2022

Class

Order

- Family
 - *Genus (species-none listed)* – common name

Class Reptilia

Crocodylia – crocodiles and alligators

- Crocodylidae – crocodiles
- Alligatoridae – alligators and caiman

Squamata – lizards and snakes

SUBORDER LACERTILA OR SAURIA – LIZARDS

- Gekkonidae – gecko lizards
- Polychridae – anoles
 - *Anolis* – anoles
- Iguanidae – iguanids
 - *Iguana* – green iguana
 - *Dipsosaurus* – desert iguana
 - *Sauromalus* – chuckwalla
- Crotaphytidae – collared lizards
- Phrynosomatidae – earless, spiny, tree, side-blotched and horned lizards
 - *Sceloporus* – spiny lizards
 - *Cophosaurus & Holbrookia* – earless lizards
 - *Uma* – fringe toed lizards
 - *Urosaurus & Uta* – tree and side blotched lizards
 - *Phrynosoma* – horned lizards
- Scincidae – skinks
 - *Eumeces* – skinks
- Anguidae – glass lizards and alligator lizards
 - *Ophisaurus* – glass lizards
 - *Gerrhonotus* – alligator lizard
- Helodermatidae – gila monster

SUBORDER SERPENTES (Ophidia) – SNAKES

- Leptotyphlopidae – blind snakes
- Boidae
 - *Charina* – rubber boa and rosy boa
- Colubridae – typically harmless snakes
 - *Nerodia* – water snakes and salt marsh snakes
 - *Storeria* – brown snakes and redbelly snakes
 - *Thamnophis* – garter, ribbon and lined snakes
 - *Heterodon* – hog-nosed snakes
 - *Coluber* – racers
 - *Opheodrys* – green snakes
 - *Elaphe* – rat snakes

- *Pituophis* – pine, bull and gopher snakes
- *Lampropeltis* – king and milk snakes
- *Tantilla* – crowned and blackhead snakes
- Elapidae – coral snakes
- Hydrophiidae – sea snakes
- Viperidae – (subfamily viperinae) pit vipers
 - *Agkistrodon* – copperhead and cottonmouths
 - *Crotalus* – rattlesnakes

Class Amphibia

Caudata (Urodela) – salamanders

- Cryptobranchidae – hellbenders
- Dicamptodontidae – giant salamanders
- Proteidae – mudpuppies and water dogs
- Rhyacotritonidae – torrent and seep salamanders
- Amphiumidae – amphimus
- Sirenidae – sirens
- Ambystomatidae – mole salamanders
- Salamandridae – newts
- Plethodontidae – lungless salamanders
 - *Desmognathus* – dusky salamanders & kin
 - *Plethodon* – woodland salamanders & kin
 - *Ensatina* – ensatina
 - *Batrachoseps* – slender salamanders
 - *Hydromantes* – web-toed salamanders
 - *Hemidactylium* – four-toed salamanders
 - *Gyrinophilus* – spring salamanders
 - *Eurycea* – brook salamanders
 - *Typhlomolge* – Texas and Blanco blind salamanders

Anura (Salientia) – frogs and toads

- Scaphiopodidae – spadefoot toads
 - *Scaphiopus* – spadefoot toads
- Bufonidae – true toads
 - *Anaxyrus* – American toad and Oak toad
- Hylidae – treefrogs
 - *Hyla* – gray treefrog & green treefrog
 - *Pseudacris* – western chorus frog, ornate chorus frog & spring peeper
 - *Acris* – cricket frogs
- Ranidae – true frogs
 - *Lithobates* – bullfrog, green frog, northern leopard frog & wood frog
- Microhylidae – narrow-mouthed toads
 - *Gastrophryne* – narrow-mouthed toads

Note: The taxonomic scheme is based upon a combination of traditional and current categories (designed to utilize familiar terms widely used in published resources available to students.)

Updated 09/2021

Event: Mystery Architecture

Description: Students will be given a bag of materials to build a freestanding tower as high as they can. The tower should be constructed to support a ping pong ball at its top.

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: May bring in scissors and a ruler to use as tools while building the tower. No other resources are allowed.

Event Managers: Will supply a bag for each team. Each team will receive exactly the same materials. Materials are unknown until the competition.

The Competition:

1. Students will have 20 minutes to construct a tower to support a ping pong ball at its highest point. The top of the ping pong ball must be higher than any part of the structure.
2. Only those materials supplied in the bag, and the bag itself, may be used to construct the tower. No other materials or adhesives may be part of the finished tower.
3. Examples of materials that may be provided include, but are not limited to: straight pins, paper cups, drinking straws, paper clips, tape, string, paper, etc.
4. Each team may bring their own ping pong ball to use while building their tower, however, all towers will be measured using the same ping pong ball provided by event manager.
5. The students are to inform the judges when they finish their tower. They will place the ping pong ball provided by the event supervisor on the top of their tower. The tower must remain standing long enough for the height and base to be measured.
6. The tower must be free standing. It cannot be attached to the tabletop, floor, wall or ceiling.

Scoring:

1. The height of the tower and width of its base will be measured as precisely as possible by the judges. Since no building materials are to extend above the ping pong ball, the ping pong ball will be considered the highest point of the tower. The width of the tower will be measured at its base. The largest diameter of the base will be recorded.
2. All towers that support the ping pong ball will be ranked above those that do not.
3. The towers in each group will be ranked according to their height. Tallest tower first, the shortest tower last.
4. In the event of a tie, the winner will be the tower with the smallest base measurement.

B/C connection: Mystery Architecture

Event: Orienteering

Description: Teams receive an instruction card which directs students from marker to marker around a course using a standard compass and pacing methods (for measuring distance) on unfamiliar terrain.

A Team Of Up To: 2 **Approximate Time:** 15 min **Impound:** NO **Visitors:** NO

Teams: Must bring their own compass, clipboard and writing instrument. Teams may bring a calculator and notes. The use of meter wheels, measuring tapes, and electronic devices will not be allowed. Students should wear closed toed shoes.

Event Managers: Will provide course, course cards and response sheet.

The Competition:

1. The course area will be within an area of 30 meters by 30 meters.
2. The course area will have approximately 30 to 50 control markers.
3. Each control marker will have letters and / or numbers written on them to be placed on the team's Test Sheet in the space provided.
4. Dummy control markers will be used in the course area.
5. There will be approximately 5 to 10 "legs" on each Test Sheet.
6. Each "leg" of the course will be 5 to 40 meters in length.
7. Each team will have the same number of control markers to locate and travel approximately the same distance.
8. Each team will receive a different Test Sheet. Other teams may be going at the same time, starting from different positions.
9. From the specified starting point, each team will follow the directions on the Test Sheet and use the specified azimuth and distance (in meters) to traverse around the course from control marker to control marker.
10. Event Manager will use magnetic north when building event.
11. This event will be run outside regardless of the weather. In case of rain, find some way to keep your Test Sheet dry.
12. Students will be using Magnetic North, not True North. Resetting to Magnetic North is not necessary at each stop, only need to set compass to next bearing.

Scoring: Participants will be first judged on the greatest number of markers correctly identified. Teams correctly identifying all control markers will then be judged on time spent on the course.

Possible Question/Station:

What a possible course card may look like:

Starting at Control Marker C,
Go 5 meters at 45 degrees to Control Marker _____.
Then, go 10 meters at 30 degrees to Control Marker _____.
Then, go 15 meters at 15 degrees to Control Marker _____.
Then, go 20 meters at 10 degrees to Control Marker _____.
Then, go 25 meters at 5 degrees to Control Marker _____.

Event: Paper Rockets

Description: Each team will build on site 1-2 rockets using provided materials and launch the paper rocket(s) towards a target.

A Team Of Up To: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Must bring testing data chart. Chart can be any size, in any form.

Event Managers: Will provide per team: 2 drinking straws (exact size will not be shared prior to the event), two 8.5 X 11" pieces of copy paper, roll of scotch tape, two sharpened pencils, one ruler, one pair of scissors.

The Construction: Rockets may only be made from: paper and tape. All other provided materials (pencils, straws, ruler, scissors) may be used to help build, but are not to be part of the rocket.

The Competition:

1. Teams will have 20 minutes to build a rocket and practice launching it. Practice launches will not be at target.
2. Students will stand behind a line and launch their rocket by blowing into the end of their own straw to launch rocket.
3. Students will launch the rocket from 3-8 meters toward a designated target on the ground. Distance may be in ½ meters.
4. Target distance will be the same for all groups and announced on competition day.
5. Teams may build one or two rockets. Teams may chose to launch the same rocket two times or each rocket one time. Either student may launch the rocket (s). There must be two launches.
6. Launches must be from the force of blowing through the straw, no other types of launches are allowed.
7. After each launch the distance will be measured from the center point of the target to the nose of the rocket where it comes to rest. The total of both distances from the two launches will be added together to become the team score. There will be a larger visual target; however the measurement is from the center point.
8. Measurements will be made in mm.
9. If any part of the rocket becomes detached, the team's score will be ranked in Tier 2.
10. Teams that do not turn in a testing data chart will be ranked in Tier 2.
11. This event may be held outdoors.

Scoring: Lowest team score (total of both distances from two launches) will be the winner. Ties will be broken by quality and completeness of testing data chart.

Resources/Notes from EM:

Another sample of paper rocket construction:

<http://www.jpl.nasa.gov/education/images/pdf/sodastrawrocket.pdf>

http://er.jsc.nasa.gov/seh/Paper_Rockets.pdf

Event: Pasta Mobile

Description: Each team will construct a vehicle entirely out of glue and pasta that, when released from the top of a ramp, will travel the greatest distance within a 1.5 m wide "lane" before stopping.

A Team Of Up To: 3 **Approximate Time:** 5 min **Impound:** YES **Visitors:** NO

Teams: While impounding the pasta mobile, each student is also required to impound their own journal, documenting trials, errors, photos, lessons learned in the process of building and testing their vehicle.

Event Managers: Will provide ramp and all equipment for timing and measuring.

The Construction:

1. Teams may use any supermarket variety of **dry pasta**.
2. The pasta must be uncooked and unaltered from original form.
3. Pasta may be shaped by filing, sanding or other dry machining techniques.
4. Any commercially available glue may be used. Glue may not be used for sculpting, and/or joint or gap filling.
5. The vehicle must be able to fit into a closed box 30cm X 15cm X 15cm. There are no mass restrictions.
6. The vehicle must make and maintain contact with the surface on which it rests on at least 3 points.
7. Simple spheres, cylinders, etc. will not do.
8. Power tools shouldn't be used.

The Competition:

1. The vehicles will be placed on the ramp so that the rearmost part of the racer is in contact with a horizontal barrier at the top of the ramp. It is then released by a student on team, no helpful nudges allowed.
2. The ramp is 1 meter high, 1 meter long and .5 meter wide. There is a 1" guard rail along both sides to keep the vehicles from falling off the launch area. (see photo)
3. The distance the pasta mobile travels will be measured from the base of the ramp to the rearmost part of the racer where it stops within the 1.5 meter lane.
4. If the vehicle leaves the 1.5 meter lane, the measurement will be taken at the first point where the vehicle crossed the boundary line.
5. Should the pasta mobile lose its structural integrity (fall apart) during its run, it will be placed in the second tier ranking and the distance factor will be determined by the largest surviving structural component.
6. This event may be held outdoors.

Scoring:

The highest scores will be awarded to pasta mobiles that remain intact and travel the greatest distance. Vehicles that do not meet the construction requirements will be ranked after those that do. Ties will be determined by the vehicle that stops closest to the middle line.



SCOPE

Event: Pentathlon

Description: Teams, consisting of 4 members, will compete in an event in with five stations. There will be four stations for individual team members to answer a science question and complete a physical task. The fifth station will be a cooperative activity completed by all 4 members.

A Team Of: 4 **Approximate Time:** 5 min **Impound:** NO **Visitors:** NO

Teams: Teams must have 4 students. Students should wear athletic clothing and closed toed shoes for completing physical task.

Event Managers: Will supply all materials to complete each station.

The Competition:

1. The course will be run as a relay for the first four obstacles and a cooperative team activity for the last obstacle.
2. Each obstacle must be completed before moving on. An example of a physical task is dribbling a basketball around a series of cones.
3. Each station will have multiple choice questions from one of the four study areas:
Earth Science: Earth's Surface, Water Weather, Earth's Resources, Ecosystems
(no other information will be given prior to the event)
Multiple choice questions will be shown and read in decreasing difficulty until one is answered correctly or after 5 missed questions. (see scoring below)
4. The event manager will tell the team what topics are at each station before team starts.
5. Once a team member completes both portions of the station, they must tag the next team member to continue.
6. When the four team members have completed their obstacles, they will join together at the fifth station to complete the cooperative-physical team activity.
7. Coaches and parents will not be allowed to enter the competition area.
8. This event may be held outdoors.

Scoring: The shortest time will determine the winning team. Time will be determined by the amount of time to complete the course added to the following time penalties for missing questions at each station.

At a station, if a student:

-answers their first question correct:	no time is added
-answers their second question correctly:	2 seconds added
-answers their third question correctly:	4 seconds added
-answers their fourth question correctly:	6 seconds added
-answers their fifth question correctly:	10 seconds added
-misses all 5 questions:	15 seconds added

Possible Question/Station:

- make a basket in the basketball hoop
- do 10 jumping jacks

Resources/Notes from EM:

Event: Picture This

Description: Team members will take turns drawing clues for a set of scientific terms or concepts from a pre-determined list (see attached) for team members who must guess the term while watching it being drawn.

A Team Of: 2 or 3 **Approximate Time:** 4 min **Impound:** NO **Visitors:** NO

Teams: No resources are allowed. Teams must have 2 or 3 members to compete.

Event Managers: Event Managers will provide all needed materials.

The Competition:

1. Teams will have 4 minutes to complete up to 21 terms
2. All teams will receive the same terms in the same order. The terms used will only be from the list provided in these rules.
3. Team members will alternate drawing and receiving clues. All team members must rotate turns on being the clue drawer and guesser. A definite order of rotation shall be followed.
4. Timing begins when the judge shows the first team member the first term. It ends when the team has correctly identified or passed the last term or when the 4-minute time period has expired. No other team member may see the term.
5. The sketcher will then draw pictures and visual clues. Letters of any alphabet or numbers of any kind are not allowed (it is the intent of this rule to prevent teams from inventing alphabets, codes, etc.)
6. The following are acceptable symbols: arrows (only to point to a part of a drawing), a minus (-) to shorten a word, a plus (+) to lengthen a word (i.e. in response to "refract" a (+) can be used to elicit the word "refraction"). No other symbols are permitted unless they represent the word(s) given. (A circle for the word sun in a solar eclipse.)
7. Team members may not give visual clues with their hands or bodies except for event leader demonstrated clues such as nodding yes or no, or to acknowledge a desired response from team members.
8. The event leader will indicate when the correct term is given. Different forms of the term will not be accepted with the exception of plurals and singulars, which will be accepted interchangeably (calorie would be accepted for calories.)
9. If a team violates any of the rules the team will be penalized 1 correct term in addition to the term in play at the time of the violation. The score will be adjusted by subtracting the 1 point penalty from the total score.
10. Any team member (person giving or receiving clues) may choose to pass on a term. Once the team passes on a term they may not return to it.
11. When the team has correctly identified or passed on the term, or if a violation occurs, the next team member will be given a new term until the team has gone through their set of terms or the time expires.

Scoring: One point will be given for each term correctly identified. The team with the most correct terms will be the winner. In the case of a tie, the first tiebreaker is the fewest terms passed. The second tiebreaker is the shortest period of time to complete the entire list. The third tie breaker is a predetermined term.

Resources/Notes from EM:

B/C connection: *Picture This*

2022 Picture This List of Terms

LIFE	EARTH	PHYSICAL
amphibian	air mass	acid
anatomy	asteroid	atom
arthropod	axis	axle
bacteria	barometer	battery
camouflage	Big Dipper	boiling point
carnivore	black hole	carbon
cell	constellation	chemist
chromosome	continental drift	circuit
digestive system	crust	combustion
dissection	earthquake	concave lens
double helix	epicenter	condensation
embryo	equator	covalent bond
eukaryotic cell	erosion	electromagnet
evolution	fault line	electron
femur	galaxy	element
fingerprint	glacier	evaporation
food chain	gravity	fission
genes	hurricane	freeze
golgi apparatus	inner core	fulcrum
habitat	latitude	heat
herbivore	longitude	insulation
heredity	lunar eclipse	light
imprinting	magma chamber	liquid
invertebrate	magnetic	mass
kingdom	mantle	matter
mammal	meteorologist	melting point
metamorphosis	mineral	meter stick
mitosis	moon phases	molecules
muscle	oceanography	motion
muscular system	ozone	neutron
nonvascular	plate tectonics	nucleus
organ	precipitation	oxygen
parasite	pressure	pendulum
photosynthesis	recycle	periodic table
pistil	reef	pipette
pollen	seasons	proton
pollution	sedimentary rock	pulley
population density	seismograph	refraction
predator	solar eclipse	shadow
recycle	stratus cloud	space
respiratory system	telescope	sponge
skeletal system	tide	velocity
stamen	tsunami	volume
vertebrate	vent	water
virus	volcano	wavelength
white blood cells	water cycle	wheel and axle

Event: Rock Hound

Description: Students will prepare charts, identify rocks and minerals and describe their characteristics.

A Team Of Up To: 2 **Approximate Time:** 20min **Impound:** NO **Visitors:** NO

Teams: Teams should bring in completed charts in students own handwriting to be used in the identification process and to aid in answering questions. Charts can be any size, in any form, from any source. No books allowed. (See chart sample)

Event Managers: Will provide all necessary items, objects, materials, questions and response sheets for students to complete stations

The Competition:

1. Teams will be asked to identify the following rocks and minerals:

Rocks

basalt	bituminous coal	conglomerate	gneiss
granite	limestone (fossil)	marble	obsidian
pumice	quartzite	sandstone	schist (garnet)
scoria	shale	slate	

Minerals

calcite	copper	feldspar (pink)	fluorite
galena	graphite	gypsum-satin-spar	halite
hematite	mica-biotite	pyrite	kaolinite
quartz (chert)	quartz (crystal)	talc	

2. Students will also be asked questions about the rocks or minerals, such as their color, density, (relative heaviness per volume), relative hardness, reaction to vinegar, shape, texture, etc.
3. Students should bring their completed charts with them to the tournament. The charts may be used in the identification process and to aid in answering any questions. Charts and answer sheets will be collected at the end of the twenty-minute period.

Scoring: High score wins. In case of ties, contestants with the most complete and accurate charts will be the winners.

Possible Question/Station:

- This specimen is called---
- What is this rock or mineral often used to make?
- It comes in ----- colors (1, 2, 3 or 4)
- It has a hardness of-----

Resources/Notes from EM:

Students may type chart instead of hand write, however EM encourages own handwriting to help memorize.

Four important things to remember:

1. Read the rules
2. Get the books
3. Do the chart
4. Practice with rock kit

Rocks and Minerals from National Audubon Society

National Audubon Society, First Field Guide, Rocks & Minerals, Scholastic ISBN O-590-05484-8 paperback, ISBN -0-590-05463-5 hard back (Not the \$19. ISBN:0-394-50269-8 as it is too complicated)

Eyewitness Series: Rocks and Minerals
Guide to the Elements

To answer the question: What do they make rocks into? A Guide to the Elements, by Albert Stwertka, Oxford University Press ISBN-13: 978-0-19-515027-8 Usually one page or so of mineral uses with pictures, very interesting

My Rock Chart Sample

Rock	Color	Streak	Layers	Texture	Shiny	Harness	Other
A							
B							
C							
D							

Relative Hardness (Moh's Scale)

Material	What it will do	Rating
Talc	Most everything scratches it	1
Gypsum	A fingernail will scratch it	2
Calcite	A copper penny will scratch it	3
Fluorite	A steel knife will scratch it	4
Apatite	A knife scratches it if you press hard	5
Feldspar	Will scratch a knife blade	6
Quartz	Will scratch glass (and all previous)	7
Topaz	Will scratch quartz (and all previous)	8
Corundum	Will scratch all except a diamond	9
Diamond	Will scratch everything	10

Event: Starry, Starry, Night

Description: The purpose of this event is to give its participants the opportunity to learn more about -- and then to test their knowledge of -- the structure and functioning of the observable universe.

A Team Of: 1-2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Please do not bring any materials.

Event Managers: Will provide all necessary items, pens/pencils, objects, materials, questions, and response sheets for participants to complete test.

The Competition:

Participants may talk quietly with their partners.

If answers to the questions are readable, there is no penalty for spelling errors.

The test will consist of 65 multiple choice and true and false questions. All questions will be taken from the handouts posted on the SJCOE Science Olympiad website.

Subjects:

1. Planets: definition of; their atmospheric compositions, distance from Sun, number of moons, rings, relative sizes, rotation periods, orbital periods
2. Dwarf planets: definition of; their location
3. Moons: major moons of the planets
4. Asteroids: composition, asteroid belt, near-Earth asteroids, Trojans, Vesta
5. Comets: composition, origin, structure, near-Earth comets
6. Other Solar System objects and features: meteoroids, meteors, meteorites, trans-Neptunian objects, Kuiper belt, scattered disk, Oort cloud, centaurs
7. Sun: atmosphere, temperature, composition, fusion, photons, the solar wind, flares, prominences, coronal mass ejections, sunspots, heliosphere
8. Earth: seasons, magnetic field, auroras, age
9. Solar eclipses: total, partial, annular; umbra and penumbra
10. Lunar eclipses: difference from and proximity in time to solar eclipses
11. Lunar month
12. Lunar phases
13. Nebulae: emission, reflection, dark, planetary, supernova remnant
14. Galaxies: spiral, elliptical, irregular
15. Milky Way: type of galaxy, diameter, number of stars, age, Solar System's location within it
16. Stars: life cycles of average and massive stars
17. Star clusters: globular and open
18. Observable universe: age, diameter, ordinary matter, dark matter, dark energy
19. Celestial sphere: ecliptic, celestial equator, celestial poles, meridian, prime meridian, zenith, nadir
20. Constellation alpha stars (see chart below)
21. Miscellaneous: rotation, revolution, exoplanet, astronomical unit, speed of light, light year, gravity, eccentricity, inclination, astrobiology, barycenter

Constellation	Alpha Star
Andromeda	
Aquila	Altair
Bootes	Arcturus
Canis Major	Sirius
Cassiopeia	
Cygnus	Deneb
Gemini	Castor, Pollux
Leo	Regulus
Lyra	Vega
Orion	Betelgeuse
Pegasus	
Scorpius	Antares
Taurus	Aldebaran
Ursa Major	
Ursa Minor	Polaris
Virgo	Spica

Scoring: Points will be awarded for the accuracy of responses. Ties will be broken by the accuracy or quality of responses to preselected questions chosen by the event manager.

Resources/Notes from EM:

All of the answers to the questions on the test will be found in the Starry Starry Night Handouts located in the SJCOE's Science Olympiad website. However, parents and coaches are encouraged to use other sources to illustrate the concepts.

<https://openstax.org/details/books/astronomy>

Visualization Explorer -- a NASA app for iOS and Android devices.

SkySafari -- a night sky app for iOS and Android devices.

Solar Walk 2 -- a planetarium app for iOS and Android devices.

<https://spaceplace.nasa.gov/en/search/kids/> -- a bit of everything

stellarium-web.org -- an excellent, easy to use planetarium; also available as an app -- for a fee

www.skymaps.com -- excellent, printable monthly skychart

www.heavens-above.com -- interactive sky chart and general astronomy

www.exploratorium.edu/ronh/solar_system/ -- an interactive website for creating distance models of the Solar System

www.windows2universe.org -- general astronomy

www.stocktonastro.org -- free monthly public sky viewing through telescopes at San Joaquin Delta College and Oak Grove Regional Park. Go to the website and click on the Star Parties link for details. Also, upon request, members of the Society will bring their telescopes to your school for viewing of the night sky.

B/C connection: Astronomy and Reach for the Stars

Event: Straw Egg Drop

Description: Each pair of students will make a device of straws and masking tape, supplied on-site by the event supervisor, to hold a raw, large, grade-A egg. The device containing the egg will be dropped from a fixed height to a target.

A Team Of Up To: 2 **Approximate Time:** 45 min **Impound:** NO **Visitors:** NO

Teams: Teams may not bring in any supplies or materials.

Event Managers: Will supply:

20 plastic, non-flexible straws (brand will not be share before the event)
One meter of 1" masking tape
Scissors
Raw egg

The Competition:

1. Students will have 20 minutes to construct a device to cushion the egg and prevent it from cracking or breaking. They will have 10 minutes to drop the device from a height of 2-8 meters onto a target. No tape may be attached to the egg.
2. There will be ONE drop per team from the prescribed height.
3. Plumb lines will not be allowed during the competition.
4. This event may be held outdoors.

Scoring:

1. Teams whose egg is unbroken after the drop will be ranked ahead of all teams whose egg is broken.
2. Teams whose egg is broken during the drop will be ranked after all teams whose egg is unbroken.
3. Teams whose egg is broken before the official drop will drop the empty container and be ranked after all teams whose egg is broken during the drop.
4. Teams in each of the three groups above will be ranked by the distance measured from the center of the bulls-eye to the farthest edge of the container or the farthest edge of any parts thrown from the container (not the egg.)
5. The winning team will be the team whose egg does not crack or break AND is the closest to the target. In the event of a tie, construction time for building the containers will be the deciding factor.

Resources/Notes from EM:

Event: Water Rockets

Description: Prior to the competition, teams will construct (up to) two rockets designed to stay aloft for the greatest amount of time.

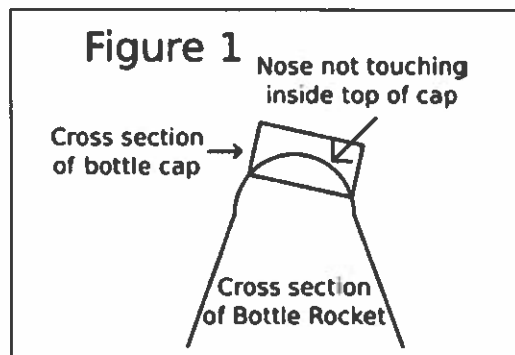
A Team Of: 2-3 **Approximate Time:** 10 min **Impound:** NO **Visitors:** NO

Teams: Must bring own eye protection. Students may bring repair kits containing tools, spare parts and extra parachutes. Teams from the same school may share a repair kit, but they may not share the same rocket or parachutes. Students should keep rockets labeled and stored with them in a safe container. Students will bring their rockets, repair kits and journals at assigned time. *Each student is also required to turn in their own journal, documenting trials, errors, photos, lessons learned in the process of building device.*

Event Managers: Will provide water rocket launcher, water and timers.

Construction:

1. Rockets must be made from a standard 2 liter soda bottle which is used to hold water and air pressure that propels the rocket when released. The structural integrity of the pressure vessel must not be altered in any way. This includes but is not limited to: physical, thermal, or chemical damage (holes, scratches, increasing the volume, restricting the bottle's opening, cutting, sanding, aluminum tape, using hot or super glues.) No glues of any type are allowed on the pressure vessel, but glue may be used on other parts of the rocket.
2. Only tape may be used to attach fins or other items to the pressure vessel. If the pressure vessel is covered in tape, paper or other material you may use glue to attach items to the covering as long as it doesn't distort or weaken the pressure vessel.
3. Commercially made rocket components, sharp/pointed objects, parts made from glass and metal are not allowed. (*Note: a small metal swivel may be used for the parachute attachment.*) No rigid plastics like PVC or ABS can be used in the front of the rocket.
4. The nose of the rocket must be rounded at the tip and designed such that when a standard 2-liter bottle cap is placed on top of the nose, no portion of the nose touches the inside top of the bottle cap (see Figure 1)
5. Event managers will assess the integrity of the pressure vessel by looking for discoloration, bubbles, thinning or cuts in the walls of bottle. Alteration to the structural integrity of the pressure vessel is a safety violation of the rocket and it must not be launched as this is a safety issue.
6. Fins, parachutes and other items may be added to the outside of the bottle to increase the time aloft.
7. No solid weights like batteries, fishing weights or hard rigid items can be used.
8. Energy to propel the rocket must come only from the water and air pressure in the bottle. Other sources of potential or kinetic energy are not allowed. Only plain tap water may be used in the rocket. No other materials of any type may be put in the bottle or added to the water. A water level line may be marked on the bottle to aid in adding water.
9. Parts of the rocket may separate during flight, but they must remain attached by string or lanyard.
10. The rocket must be identified with the school and team name.



The Competition:

1. Any parts found to be dangerous (glass or metal), illegal (commercially made rocket parts) or that prevent a rocket fitting on the launch pad must be removed before the rocket can be launched. Rockets that are changed to meet the construction requirements will not be penalized. Rockets that cannot be made to fit on the launcher or those that in the event manager's judgment are unsafe will not be launched.
2. A Pitsco launcher will be used.
3. Two launches will be allowed. Different rockets may be used for each launch. Students must use the water, launch pad and source of pressure provided by the event supervisor. The students will add the desired amount of water to the rocket before each flight and may make alterations or repairs to rockets between launches. **Outside assistance/coaching from the sidelines is not permitted and will be grounds for disqualification.**
4. The judges will pressurize the rocket to 75 psi. Anyone within 10 meters of a pressurized rocket must wear eye protection. Contestants may not hold their rocket during pressurization. Please do not exceed this pressure when practicing. Only coaches should pressurize the rocket.
5. Once a rocket has been pressurized it must be launched. **In case of high wind, rocket needs to be launched** as quickly as possible. It will be the supervisor's decision whether the flight should be considered as unofficial due to the weather conditions.
6. Have parachutes packed and rocket ready before placing on the launcher.

Scoring:

1. Judges will measure and record the time aloft for each flight. Time starts when the rocket is launched and stops when any part of the rocket touches the ground, or any object in contact with the ground (tree or building.) Teams will be scored using only the flight that will produce the better score/rank.
2. Flights of rockets whose parts do not remain attached together during the entire flight or that cannot be changed to meet the construction requirements will be ranked by their time aloft, behind all flights of rockets without construction violations and whose parts remain attached.
3. Teams whose rockets cannot be launched for any reason will receive participation points only.
4. The longest time aloft wins. Ties will be broken using the team's lesser flights times. Teams with two flights will win ties over teams with only one flight.

Please note: Do not use parts of rockets from previous years. Judges may ask students how rocket was built. The students must have built the rocket.

Resources/Notes from EM:

We suggest removing plastic ring near the opening so rockets fit on launch easier.

B/C connection: Bottle Rockets

Event: Write It/Do It

Description: Technical writing skills are an important part of an engineer or scientist's abilities to communicate precisely and clearly. This event will test a team's ability to effectively communicate by having one team member write a description of how to build a device and having his or her partner re-construct the device from raw materials.

A Team Of: 2 **Approximate Time:** 50 min **Impound:** NO **Visitors:** NO

Teams: Teams must bring a writing instrument. No other resources are allowed.

Event Managers: Will provide paper and all necessary materials.

The Competition:

1. This event will occur in two rooms so that the builders are held while the describers are writing.
2. One team member (the writer) is shown an object (which may be abstract) built from, but not limited to science materials, inexpensive materials (straws, push pins, styrofoam balls, paper cups, popsicle sticks, etc.) or commercial sets (K'nex, Tinker Toys, Lego, Lincoln Logs, etc.)
3. The "object" will be the same for all teams.
4. A maximum of 20 pieces will be used.
5. No extra pieces will be added to the "do" portion.
6. The writer has 25 minutes to write a description of the object and how to build it. There will be no advantage to finishing early.
7. Only words and numbers may be used. Pictures, symbols, drawings and diagrams are not allowed, with the exception of common punctuation and editing symbols. Punctuation marks and/or editing symbols that can be produced on a keyboard by pressing a single key or a single key along with the shift key may be used as long as it is used in their normal context and not as symbols to form a key or code.
8. All abbreviations must be defined either at the beginning or when the abbreviation is first used.
9. The event leader will pass the description to the other team member (the doer) who will use the description to re-create the original object in twenty (20) minutes.

Scoring:

1. The team that builds the object most like the original object and has properly written instructions wins.
2. Points will be given for each piece of material placed in the proper connection and location compared to the model.
3. Time for the construction phase will be used as a tiebreaker.

Resources/Notes from EM:

B/C connection: Write It/Do It