Florida SCIENCE OLYMPIAD™

*Exploring the World of Science*

2019

# ELEMENTARY SCIENCE OLYMPIAD RULES

# Table of Contents

GENERAL INFORMATION……3

EVENT RULES:

A MATTER OF MATTER ..... 6

CHEW THE FAT ..... 7

DEEP BLUE SEA ..... 8

ESTIMANIA ..... 9

MISSION POSSIBLE ..... 10

MYSTERY POWDERS ..... 12

NAME THE SCIENTIST ..... 14

PICTURE THIS – ANIMALS/HABITATS ..... 15

REFLECTION RELAY ..... 17

STRAW EGG DROP ..... 20

TENNIS BALL CATAPULT ..... 22

TOWERS ..... 25

WATER ROCKETS ..... 27

WEATHER PERMITTING ..... 30

COACH PAPERWORK ..... 31

# GENERAL INFORMATION

Thank you for registering for a 2019 Elementary Florida Science Olympiad Tournament. Science Olympiad's goal is to provide students with a quality competition that links collaboration, inquiry, content understanding, and assessment. Science Olympiad has been highlighted in the 2007 National Governors Report as a national model to learning science and mathematics. Each year, we ensure that we select events that correlate well with Florida's current State Standards.

In the tradition of sporting events, Science Olympiad awards medals/ribbons to the top performing students in each event and trophies to the top performing teams. Students take pride not only in their performance but also to their contribution to the team's performance. Often, students depart the competition with a strong sense of accomplishment, looking forward to next year, yet their ranking may indicate a quite different response would have been expected! Science Olympiad builds a love of science and learning that goes beyond all other academic programs.

This rich experience provides students with something that no other competition does: It encourages teamwork, problem solving, and critical thinking.

**TEAM SPIRIT:**

Although some events in the Science Olympiad are based on individual achievement, all events involve teamwork, group planning and cooperation. That is the real essence of the Science Olympiad. Our emphasis is on advanced learning in science through active, hands-on, group participation. Through the Olympiad, students, teachers, coaches, principals, business leaders, and parents are all bonded together as a team working toward a goal.

We would like to provide an alternative to the "isolated scientist" stereotype and remind students that science can be fun, exciting and challenging all at the same time. In college and beyond, students will find that the team spirit and good sportsmanship they develop during Science Olympiad will be deciding factors in their success.

**COACH PREPARATION:**

The most important thing to remember is that this competition is for the students. It is strongly encouraged that the coach take a facilitation role and accept the fact that s/he cannot know everything about every event- put the onus on the student to do research and critically read the rules. The events change slightly annually so even long-term coaches will be faced with new challenges every year, which keeps the level of competition high. Many events require students to explain their design choices and/or complete lab work on their own. Teams who have a coach who takes a student-focused approach will have a stronger competitive team.

**AREA TOURNAMENTS:**

Each elementary level team of 12 will prepare throughout the school year to compete in a Science Olympiad tournament. These inter-scholastic competitions consist of a series of approximately 14 team events that encourage learning in biology, earth science, chemistry, physics, problem solving and technology.

Events in the Science Olympiad have been designed to recognize the wide variety of skills that students possess. While some events require knowledge of scientific facts and concepts, others rely on science processes, skills or applications. This ensures that everyone can participate, including students from technology classes or advanced science classes.

Teams are welcome to compete in as many tournaments across the state as desired. However, the team must register and pay the $165 ($195) fee for each tournament.

Once you have registered your team, communication for that event will come from the tournament director. Information such as team number may vary from tournament to tournament.

Individual tournaments reserve the right to make rules clarifications or to set their schedule as needed. While most tournaments will run all the events listed in the rules manual, please be sure to see your specific tournament's schedule to confirm.

**STATE TOURNAMENT**:
Starting in the 2019 competition year, we will be offering the opportunity to compete at a State Competition to take home medals and trophies along with the title of "State Champion". For the 2019 school year, any team who competed at another tournament is welcome to register for the state tournament. There is an additional registration fee for this tournament.

**GENERAL EVENT INFORMATION:**
The following apply to all events, even if not noted in the specific rules. Please read carefully:

1. For every event, **it is the responsibility of the competitors to bring their own writing utensils** along with any other items listed in the rules. Teams without eye protection will not be able to compete in any events that require eye protection. Please check the rules for details.
2. **Impound** means that some of your devices or boxes must be put in a holding area before the event begins. These must be turned in to specific places at specific times. Anyone on the team can impound the device; parents and coaches are welcome to help the kids with this piece. The team will be penalized if this is not done on time.
3. In any open events where spectators are allowed, it is up to the discretion of the event supervisor as to the area where spectators are allowed. The event supervisor has the final right to ask spectators to leave and/or to disqualify teams for members (student, parent, coach, etc.) who are disrupting the flow of the competition.
4. Events are designed to allow for a range of results- some teams will find the event very difficult and some might find it easier. Since this is a competition, events are written for a wide range of final scores and to avoid ties in scores.

**PARENT/CHAPERONE ROLE DURING COMPETITION**:
1. Parents and chaperones may feel free to move about common areas as identified by the tournament director, but may not interfere with their activities or enter rooms when doors are closed.
2. Parents/chaperones may not yell out instructions to students during open events. Parents should not argue or discuss scoring with the judges. If a judge believes a parent has behaved in a disruptive manner, **this will be ground for immediate disqualification of the entire team.** STUDENTS may arbitrate judging concerns using the arbitration process.
3. If a judge believes a parent has interfered or helped a student in any way, **this will be ground for immediate disqualification of the entire team.**

**COACH ROLE DURING COMPETITION**:
Students will be in various rooms around campus. Feel free to move about the common areas as identified by the tournament director, but please do not interfere with their activities or enter rooms when doors are closed. If a judge

believes a coach has interfered or helped a student in any way, this will be ground for immediate disqualification of the entire team.

**CODE OF CONDUCT**:

As part of the paperwork that coaches need to bring to competition, there is a Code of Conduct form to complete by students and the coach. Student participants are expected to compete in tournament events with an honest effort to follow the rules and spirit of the competition. The goal of the competition is to give one's best effort while displaying honesty, integrity, and sportsmanship.

In addition to students, coaches and parents are expected to display courtesy and respect toward Olympiad officials, other teams, and guests of the Olympiad. Please remember all officials are volunteer specialists in their field and should be extended every courtesy.

Failure to show honesty and/or courtesy by a participant, coach, or guest of the team may result in disqualification of the team from that event and/or from the entire competition.

**ARBITRATION**:

At times, events might be run in a way that students feel violate the rules. While every effort is made to ensure high correlation with the published rules, there are times when errors by the event supervisor or other issues may arise. In an effort to ensure that all student competitors have an outlet to share their concerns with rules violates, students may complete the arbitration process during the competition. Here are a few notes:

- The tournament director will provide teams with Arbitration forms and have these forms available at the tournament.
- Forms must be completed by STUDENT competitors. It is acceptable to the coach to assist, but the student should write up the arbitration and complete the process.
- The STUDENT must go to the event supervisor where there is a challenge and have him/her fill out their section. Arbitrations will not be processed without an event supervisor or judge signature.
- This process should not be combative- it is essential that the student approach the supervisor with respect and identify the rule the s/he feels was broken and explain their concern. The event supervisor may agree or disagree but should not engage in a verbal argument with the student- all information should be provided on the document.
- Arbitrations MUST be completed within ONE HOUR of the end of the event block time where the issue occurred. If necessary, another team member may complete the arbitration process for their team mate if their schedule prohibits this.
- Students may not arbitrate against another team- ex. "The other team did not do ….". Arbitrations are related to the event's alignment with the rules.
- There will be times when the tournament logistics or limitations of a supervisor will make the event unable to be run in alignment with the rules- we attempt to run all the events even if there may need to be adaptations. In this case, every team will be subject to the same parameters of the event to ensure consistency. Part of Science Olympiad is problem solving and adapting to situations. In these cases, arbitrations will likely end in no change to the procedure.
- Arbitrations will be evaluated by a team selected by the tournament director and results will be posted somewhere at the tournament within an hour of receipt so the team can pick up their completed arbitration form.

# A MATTER OF MATTER

**Description:** Teams will be asked questions or will conduct experiments at stations as they relate to the properties of matter. **Safety googles are required.**

**Number of Participants:** 2

**The Competition:**

1. Teams are allowed to bring **writing instruments** and a **3-Ring binder**, of any size, to the competition. The binder may contain any item, such as a book, computer generated printout, or student created paperwork. No electronic materials are allowed, such as a computer, calculator or smartphone. All materials must be securely bound inside the binder, so that when it is opened vertically (upside down) and given a light shake test no materials will fall out.

2. Each team will move from one station to another. There will be no more than 5 stations.

3. Team will either be asked questions or will be required to complete experiments or make observations as they relate to the properties of matter.

4. The properties of matter that may be tested or in which an experiment may be conducted include:
    a. Determine what will affect the rate of a solid dissolving in a liquid, including temperature, concentration, polarity, agitation rate, particle size, that can be tested in the lab. Pressure will not be tested.
    b. Compare and contrast the physical and chemical properties of solids, liquids, and gases.
    c. Describe or be asked to separate a given set of mixtures, or solutions using materials provided by the supervisor.
    d. Identify physical versus chemical changes or conduct an experiment to identify and measures these changes.
    e. Identify solutes, solvents, and solutions from given examples.

**Scoring:**

1. High score wins.
2. Each question or station will be assigned a predetermined set of points, assigned by the event supervisor teams will be given on the handouts the point value assigned to each question or activity; activities will total at least 100 possible points.
3. Ties will be broken with pre-determined tie-breaker questions.

# CHEW THE FAT

**Description:** Teams will demonstrate knowledge of the human digestive system and proper nutrition.

**Number of Participants: 2** **Impound: NO**

**The Competition:**

Teams are allowed to bring **writing instruments** and a **3-Ring binder**, of any size, to the competition. The binder may contain any item, such as a book, computer generated printout, or student created paperwork. No electronic materials are allowed, such as a computer, calculator or smartphone. All materials must be securely bound inside the binder, so that when it is opened vertically (upside down) and given a light shake test no materials will fall out.

This event will be run in a station format. Teams will rotate through stations that assess any or all of the following topics:

1. Identify the major organs and body parts involved in the digestive process and understand the important job each body part has:
    a. salivary glands
    b. taste buds
    c. teeth: incisors, premolars, molars, and canines
    d. esophagus, stomach, liver, small intestine, large intestine
    e. kidney, urine, bladder
2. Compare and contrast chemical and physical digestion.
3. Understand food and the benefits of vitamins & minerals.
    a. Vitamin List: A, B, C, D, E, K
    b. Minerals List: Calcium, Iron, Magnesium, Phosphorous, Sodium
4. Be able to test for the presence of fats and oils using the paper bag test and know which foods tend to contain high amounts of fats and oils.
5. Know what foods are considered starches and the result of an iodine test on starch and non starch foods. Students will not be required to perform this test but may be shown pictures of the results of this test and asked to draw conclusions about the results.
6. Know how to use food labels to make better food choices, specifically identifying serving size, vitamin and mineral content, overall caloric content plus identifying where the calories are coming from (fat, protein, carbohydrate).
7. Know common foods in the major food groups: fruits, vegetables, grains, protein, dairy and where they fit in the food pyramid and in the USDA My Food Plate.
8. Understand the relationship among the amount of food energy (calories) consumed, weight, and metabolism.

**SCORING:** Points will be awarded for the accuracy of responses. Ties will be broken by the accuracy or quality of responses to pre-selected questions chosen by the event supervisor.

# DEEP BLUE SEA

**Description:** This event will test students' knowledge about oceanography.

**Number of Participants: 2** **Impound: NO**

**The Competition:**

Teams are allowed to bring **writing instruments** and a **3-ring binder**, of any size, to the competition. The binder may contain any item, such as a book, computer generated printout, or student created paperwork. No electronic devices are allowed, such as a computer, calculator or smartphone. All materials must be securely bound inside the binder, so that when it is opened vertically, no materials will fall out.

1. In **Part I** the contestants will view pictures and answer questions relating to identifying Atlantic Ocean flora or fauna. They may also be asked questions about the Atlantic Ocean organism's habitat or life cycle.

2. The list of flora and fauna will come from the following list:

| | | | |
|---|---|---|---|
| **FLORA**: | Algae | Seaweed | turtle-grass |
| | Kelp | sea oats | paddle-grass |
| | Johnson's seagrass | pennyworts | Thong weed |
| **FAUNA**: | Bottlenose Dolphin | Green Sea Turtle | Atlantic Sturgeon |
| | Blue Mussel | Leatherback Sea Turtle | Acadian Red Fish |
| | Longfin Squid | Hawksbill Sea Turtle | Atlantic Cod |
| | Northern Quahog Clam | Loggerhead Sea Turtle | Red Hake |
| | Atlantic surf clam | Atlantic Spiny Dogfish | North Atlantic Swordfish |
| | Grooved carpet shell clam | Atlantic Shortfin Mako Shark | Atlantic Blue Fin Tuna |
| | Starfish | Right Whales | Atlantic Hairy Triton |
| | Sand Dollars | Beluga Whale | Atlantic Triton's Trumpet |
| | Blue Sea Slug | Blue Whale | Summer Flounder |
| | Atlantic Sea Scallop | Bowhead Whale | Winter Flounder |
| | Manatee | Humpback Whale | Winter Skate |
| | Black Sea Bass | Commerson's dolphin | Atlantic Salmon |
| | Monkfish | Heaviside's dolphin | King Mackeral |
| | | | Scup |

3. In **Part II** the contestants will respond to a series of questions related to the following topics:
   a. Physical features of oceans (trenches, seamounts, etc.)
   b. Phenomena (tidal waves, currents, surface current, long shore currents, etc.)
   c. Geography (location and identification of oceans, seas, major bays, etc.)
   d. Conservation efforts to protect ocean animals and sea floor

**Scoring:**

1. High score wins.
2. Points will be awarded for correct responses as identified on the test. Part I will count at 60% of the score and Part II will count as 40% of the score.
3. Ties will be broken with pre-determined tie-breaker questions.

# ESTIMANIA

**Description:** Students will be asked to estimate answers to questions or complete task related to estimation.

**Number of Participants:** 2 **Impound: NO**

**The Competition:**

1. Students may bring **writing instruments**, a **non-programmable calculator** and other various types of unlabeled equipment that will help them with estimations such as rulers, cups of various sizes, spoons, etc. Each piece of equipment must not contain written numbers or words indicating sizes or dimensions.)
2. Students will be asked to answer questions requiring an estimation between 10 and one million. Some examples of questions include, but are not limited to the following:
    a. How many pennies are in the jar?
    b. How many two-centimeter paper clips could be laid end to end across a standard football playing field?
3. The teams may move to various stations and perform activities related to estimation. Some of the activities may include, but are not limited to the following:
    a. Given an unmarked container, estimate 100 mL of water
    b. Given a box, estimate the volume
    c. Given a substance, estimate 100 grams of that substance
4. **Concepts tested may include any of the following:**
    a. **Estimate numbers of items in a group**
    b. **Estimate angle degree, mass, volume, length, area, or temperature of various objects or situations in metric units to the precision requested.**
    c. **Understand relative scale of metric units and which is appropriate for measurement (mg, g, kg, mm, cm, m, km, mL, L, kL, $^{o}$C, $^{o}$K, cm$^2$, cm$^3$) in different scenarios.**
    d. **Make estimates of data between or beyond the data points given.**

**Scoring:**

1. High score wins.
2. Questions will be given preassigned value amounts by the event supervisor and teams will be given on the handouts the point value assigned to each question or activity. **Activities will total at least 100 possible points.**
3. Tiebreakers will be a predetermined and announced set of questions as defined by the event supervisor.

# MISSION POSSIBLE

**Description:** Participants will design, build, bring, and test a Rube Goldberg-like device which incorporates up to 20 unique Action Transfers and uses up to five forms of energy in accomplishing a given task in two (2) minutes. Devices will be constructed prior to the competition. **This is a PRE-BUILT EVENT.**

**Number of Participants:** 2 – 3 **Impound: YES**

**The Competition:**

1. Teams will design the device to complete a final task of raising a flag, at least 2 cm, at the end of 2 minutes.

2. The device will be started by some action of the team such as switching a switch, pushing a button, dropping an object, etc. Once the device is started the team must step back and wait behind the line designated by the Event Supervisor.

3. **The device must be able to be moved, if requested by the event supervisor, from the impound location to the testing location. Teams will have a maximum of 5 minutes to move and reset their device for testing.**

4. **Adults may be able to help with impound but will not be able to assist during the testing blocks. Coaches should ensure that students are able to move their device from the impound location to the testing location, if necessary. If adults enter the competition area, the team may be disqualified.**

5. The device must fit inside an imaginary box **1 meter long**, 1 meter wide, x 1.5 meters high and MUST fit through a single door opening. The device may use ambient room light but must not depend on direct sunlight to operate. All other sources of energy and actions must take place within the imaginary box before, during and after the device's operation. The event will be held indoors.

6. The task must be accomplished as close to 2 minutes as possible.

7. Points are awarded for each UNIQUE ACTION TRANSFER, which do the following:
    a. Create a unique action
    b. Cause a subsequent action that contributes to the completion of the task.

8. The term unique means that a particular action can only count the first time that it is used. Identical Action Transfers may be used but will not result in additional points. For example, a rolling ball could flip a switch as one Action Transfer and a series of cascading objects (dominoes) that cause the next action would represent ONE Action Transfer. The rolling ball and dominoes can be used again but not scored.

9. Points will also be awarded for each of the following FORMS OF ENERGY used: electrical, mechanical (potential and kinetic), heat, chemical, or electromagnetic (light, laser, infra-red, etc.). No electric device may have or use an electric potential difference of more than 9 volts.

10. Teams must submit **a flow chart** to the Event Supervisor before the device is set up which describes the sequence in which the ACTION TRANSFERS will occur and lists the FORMS OF ENERGY used. Scoring will be based only on the Action Transfers and Forms of Energy contained on the flow chart. The ONE PAGE flow chart must be easy to follow (well organized, neatly done, may contain diagrams and brief text).

11. **Each device must pass a safety inspection BEFORE operation. Uncontrolled or hazardous non-shielded falling of launched objects, hazardous materials or spills, hazardous flammable substances, faulty wiring, or any other potential hazard can result in the team being unable to compete and considered a no-show for this event.**
    .

12. Devices can be restarted during the test WITH EVENT SUPERVISOR PERMISSION. Any student contact with the device without the supervisor's permission can lead to disqualification.

**Scoring:**

The scoring is based on the number of Unique Action Transfers and Forms of Energy used in the task completion, are successfully accomplished by the device and are on the flow chart.

1. High score wins.
2. Points will be awarded using the following:
    a. 10 points awarded for each successful Unique Action Transfer
    b. 20 points awarded for each Form of Energy used (maximum of 5)
    c. 50 points awarded for successful completion of the final required task
3. Penalties will be assessed using the following:
    a. Subtract 1 point for each second over or under the two-minute time limit to accomplish the final required task.
    b. Subtract 10 points for each time the device stops and must be restarted.
    c. Subtract 5 points for each object that falls out or off of the imaginary box (up to a maximum of 30 points)
4. Devices will be ranked in the following way:
    a. Tier 1: Teams with a completed flow chart outlining the Action Transfers and Forms of Energy.
    b. Tier 2: Teams without a completed flow chart.
5. Ties will be broken by quality of the flow charts.

# MYSTERY POWDERS

**Description:** A team of two contestants will be asked to identify a mixture of common white household powders. Safety precautions MUST be used. These include **wearing self-brought safety goggles**, washing hands and not taste-testing. Bring **writing instruments.**

**Number of Participants:** 2 **Impound: NO**

**The Competition:**

1. Three mixtures containing two to three powders will be placed in containers marked A, B, and C. Mixtures will include powders from the following list only: sugar, baking soda, flour, salt, corn starch, and white sand.

2. Mixture A will have two mystery powders. Mixture B will have three mystery powders. Mixture C will contain either three or four powders. Teams will not be told how many powders are contained in Mixture C.

3. No tasting or touching of powders will be allowed.

4. Teams will be supplied with the following materials to aid in the identification of the powders: vinegar, water, a candle, aluminum foil, a clothespin or clamp, iodine solution, magnifying lens, and black paper. A candle test will be used and an adult must be present at this station at all times. Students will not be allowed to bring other materials for testing.

5. Participants will create a Powder Properties chart describing the powders' reactions to the above materials before attending the tournament. This chart should be brought to the tournament. The chart and answer sheet will be collected at the end of the event.

6. Teams will be given an Evidence Table in which students will state which tests were used to positively identify each powder and each mixture. Teams will fill out this table writing down the evidence used to make their determination.

7. Safety precautions MUST be used. Students must bring and WEAR their own splash-proof safety goggles. Long hair must also be tied back or secured.

**Scoring:**

1. High score wins.
2. Points will be awarded as assigned on Evidence Table below.
3. Ties will be broken by examining the quality of the Powders Property Chart. Students who do not provide a Powders Property Chart will be scored in a Tier 2, behind all teams that provide this chart.

## Evidence Table

| | Mixture A | Mixture B | Mixture C |
|---|---|---|---|
| | **2 powders** | **3 powders** | **3-4 powders** |
| **Which powders are in the mixture?** | 4 points | 6 points | 6-8 points |
| **Which tools were used to determine powder 1?** | 2 | 2 | 2 |
| **Evidence to determine powder 1.** | 2 | 2 | 2 |
| **Which tools were used to determine powder 2?** | 2 | 2 | 2 |
| **Evidence to determine powder 2.** | 2 | 2 | 2 |
| **Which tools were used to determine powder 3?** | | 2 | 2 |
| **Evidence to determine powder 3.** | | 2 | 2 |
| **Which tools were used to determine powder 4?** | | | 0-2 |
| **Evidence to determine powder 4.** | | | 0-2 |

**Point values shown in the cells are maximum points for each cell.

# NAME THE SCIENTIST

**Description:** Teams will identify prominent scientists and their contributions to their fields.

**Number of Participants:** 2 **Impound: NO**

**The Competition:**

1. Teams are allowed to bring **writing instruments** a **3-Ring binder**, of any size, to the competition. The binder may contain any item, such as a book, computer generated printout, or student created paperwork. No electronic materials are allowed, such as a computer or smartphone that can connect to the internet. All materials must be securely bound inside the binder, so that when it is opened vertically, no materials will fall out.

2. Teams will complete a *Concentration Type* matching activity. The cards will contain scientist names that are to be matched to their major invention, contribution, or discovery.

3. Teams will also complete a quiz which might include questions related to:
   a. The scientist's contribution to science,
   b. The scientist's background such as education, location of birth, location of major discoveries, and appropriate questions on the scientist's personal life,
   c. Scientific processes generally used by scientists.

4. Questions will focus on the following scientists:

| | |
|---|---|
| Benjamin Franklin | Sir Isaac Newton |
| Galileo | Anton Van Leeuwenhoek |
| Wilbur Wright | Eli Whitney |
| Thomas Edison | Edward Teller |
| Alexander Graham Bell | Robert Goddard |
| Edwin Powell Hubble | Wilhelm Rontgen |
| Carolus Linnaeus | John James Audubon |
| George Washington Carver | Louis Pasteur |
| Sally Ride | James Wyatt |
| Sir Henry Cavendish | Sir Humphrey Davy |
| Robert Fulton | Gregor Mendel |
| Joseph Priestly | Charles Darwin |
| Linus Pauling | Jonas Salk |
| Albert Einstein | Neil Armstrong |
| Johann Kepler | Antoine Lavoisier |
| Michael Faraday | John Dalton |
| Edward Jenner | Samuel F.B. Morse |
| Madame Curie | Rachel Carson |
| William Harvey | Robert Koch |
| Andre Ampere | Robert Bunsen |

**Scoring:**

1. High score wins.
2. Teams will be awarded points for correct answers based on a predetermined scoring method which is outlined on the answer sheet. **Activities will total at least 100 possible points.**
3. Ties will be broken with predetermined tie-breaker questions.

# PICTURE THIS – ANIMALS/HABITATS

**Description:** The objective is to have a team member draw a representation of a particular **animal/habitat** term or concept for team members who must guess the term while watching it being drawn.

**Number of Participants:** Up to 3 **Impound: NO**

**The Competition:**

1. Each round shall run 5 minutes. There will be a maximum of 30 words provided to each team. All teams will use the same words in the same order.
2. At the start of the competition one team member, hereafter called the sketcher, will be selected to draw the **animal/habitat** related term. No other team member may see the term. The other team members will try to identify the term being drawn.
3. Time will be recorded. Time will start as soon as the sketcher touches the paper with their marker. Time will stop either at the 5-minute mark or when the last term has been identified.
4. When instructed by the moderator, the sketcher will begin by drawing pictures and visual clues on materials provided by officials. Sketches will be done ON PAPER (not chalkboard) for later documentation, if necessary.
5. The sketcher may not speak except to notify the judge that the team wishes to pass that particular term. When a pass occurs, the judge will give the next sketcher a new term. The team may not go back to any passed terms.
6. 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.) The following are acceptable symbols: to shorten word -; to lengthen word +; (e.g. refract with a + to get "refraction," etc.).
7. Sketchers may not give visual clues except to acknowledge a desired response from team members. If the term consists of two or more words the sketcher may write down any of the word(s) only after the word(s) has been correctly identified by the team members. The number of words may be represented with pluses (+)
8. If a team violates any of the rules regarding the use of alphabets, numbers, verbal communication, etc. the team will be penalized 1 correct term for each letter or number used, to the term in play at the time of the violation. (The score will be adjusted by subtracting the l-point penalty from the total score.)
9. The **supervisor** will indicate when a correct response is given. Forms of the word will not be accepted with the exception of plurals and singulars, which will be accepted interchangeably. After the judge indicates it was a correct response, the team will be given a new term.
10. At any time, a team may rotate a sketcher. However, time will not stop when the change is taking place.
11. Play continues in this manner for five minutes or until the team has gone through their set of terms.
12. **Terms will be selected from the attached list and may vary from tournament to tournament. However, all words will be the same for all teams at the same tournament.**

**Scoring:**

1. High score wins.
2. Teams will receive 2 points for each correct term.

3. Teams will be penalized 1 point for each communication violation.
4. In the event of a tie, teams with the greatest number of consecutive correct terms (at any point during the round) will receive more favorable rank.
5. A second tie breaker will be determined with the fewest passes, with the team with the fewest passes receiving the more favorable rank.
6. A third tie breaker is time, with shortest time to complete the terms receiving the more favorable rank.
7. A final tie breaker is quality of the sketches as determined by the judge.
8. Negative scores are permitted.

## Word List 2019

Abiotic
Adaptation
Amphibian
Animal
Appendages
Aquatic
Atmosphere
Behavior
Biologist
Biome
Biotic
Bird
Bog
Boreal Forest
Botanist
Camouflage
Canopy
Carbon cycle
Carnivore
Carrying Capacity
Cell
Chaparral
Chrysalis
Climate
Commensalism
Community
Coniferous Forest
Consumer
Decay
Deciduous
Deciduous Tree
Decomposer
Defense
Desert
Digestion
Ecology
Ecosystem
Egg
Embryo
Endoskeleton
Energy
Energy Pyramid
Environment
Equilibrium
Estuary
Evergreen
Exoskeleton
Extinct
Fin
Food Chain
Food Web
Fossil Fuel
Freshwater
Fur
Gemination
Gills
Grassland
Habitat
Herbivore
Herpetologist
Hibernate
Homeostasis
Hybrid
Incisor
Incubate
Insect
Instinct
Interdependent
Invasive
Invertebrate
Kingdom
Larva
Life Cycle
Limiting Factor
Mammal
Marsupial
Marine
Metamorphosis
Migrate
Mimicry
Mutualism
Niche
Nitrogen Cycle
Nocturnal
Ocean
Offspring
Omnivore
Organism
Ornithologist
Parasite
Pathogen
Permafrost
Photosynthesis
Polar
Pollinate
Pollution
Population
Prairie
Precipitation
Predator
Prey
Primate
Producer
Protein
Protist
Pupae
Rainforest
Raptor
Reptile
Respiration
Savanna
Seed
Scales
Skin
Species
Spore
Survive
Symbiosis
Taiga
Temperate Forest
Temperature
Tentacles
Terrestrial
Tropical
Tundra
Urban
Variation
Vascular
Vertebrate
Water cycle
Wetland
Webbed foot

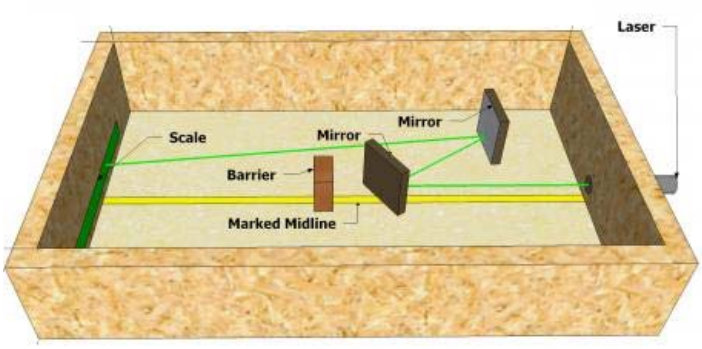
# REFLECTION RELAY

**Description**: Three team members cooperate to bounce a light beam (from a laser pointer, etc.) onto a predetermined target.

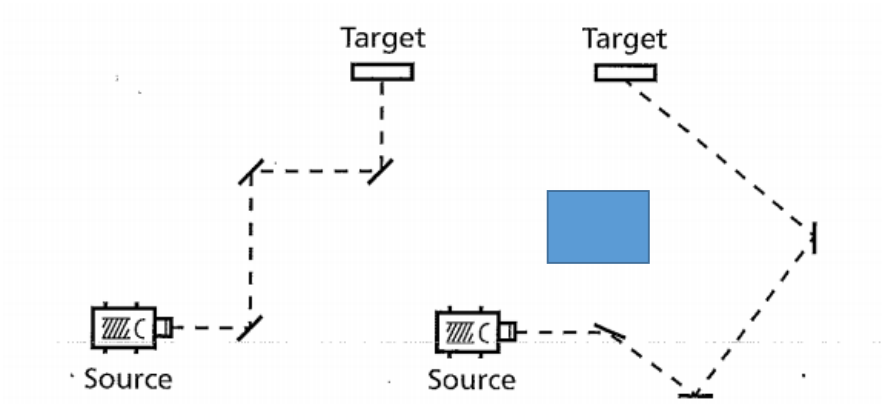
**Number of Participants: 3** **Impound: NO**

**The Competition- Part 1:**

1. The laser shoot will happen inside a box similar to the one shown below. Dimensions of the box may vary but the box itself should have no side longer than 1 meter.




2. Teams will be provided three mirrors and an eye safe Class 3b red laser. The light must strike each of the three mirrors before hitting the target and there may be obstacles that the beam of light will have to be directed around. (see sample diagram)




3. The three team members must cooperate to direct the always on beam of light on the target. They must use all three mirrors to change the light's path.
4. Each team will be given up to one minute of preparation time before the clock is started.

5. Each team will be timed with the score being the number of seconds it takes to reach the objective. Teams will have up to four minutes to complete the task with the maximum score being 120 points.
6. **Students may turn the laser on as needed during the part of the competition.**
7. **At no time should students look directly into the laser.**

**The Competition- Part 2:**

1. Each of the three team members are provided a mirror on a stand (mirror perpendicular to the floor) and must cooperate to calculate the placement of their three mirrors to bounce a light beam onto a predetermined target. **Each member should place one mirror.**
2. Teams must use all three mirrors to change the light's path and hit the predetermined target. There may be obstacles that the beam of light will have to be directed around.
3. In this part, during mirror placement, the light source is turned off. The team should tell the judge prior to turning on the light source **and should not touch the laser**.
4. Each team starts with a score of 120. The score is reduced by 30 points per mirror that is hit by the light source. An additional 30 points is removed if the target is hit. A perfect score of 0 is awarded to any team that uses all three mirrors to bounce the beam of light and hit the target.
5. The distance from the target to the center of the laser beam will be recorded. This distance will be recorded along the length of the wall of the box, including any turns in the box between the target and laser. The distance will be recorded in centimeters.
6. Teams may have up to 5 minutes preparation time before the light source is turned on and the score is determined.

**Scoring:**

1. Low score wins.
2. For part 2, each team starts with a score of 120. The score is reduced by 30 points per mirror that is hit by the light source. An additional 30 points is removed if the target is hit. A perfect score of 0 is awarded to any team that uses all three mirrors to bounce the beam of light and hit the target.
3. Total scores will be calculated as follows:

   Number of seconds to complete part 1 (up to 120) + score for part 2 + distance of laser point to target= total score
4. Ties will be broken using the shortest amount of preparation time for both parts.

# Reflection Relay Scoring Sheet

School: _____ Team Number: _____

Scoring:

1) Low score wins.
2) For part 2, each team starts with a score of 120. The score is reduced by 30 points per mirror that is hit by the light source. An additional 30 points is removed if the target is hit. A perfect score of 0 is awarded to any team that uses all three mirrors to bounce the beam of light and hit the target.
3) Total scores will be calculated as follows:
4) Number of seconds to complete part 1 (up to 120) + score for part 2 + distance of laser point to target= total score
5) Ties will be broken using the shortest amount of preparation time for both parts.

**PART 1:**

| **Each team will be given up to one minute of preparation time before the clock is started.** | **TIME IN SECONDS TO REACH THE TARGET: _____** |
|---|---|
| Each team will be timed with the score being the number of seconds it takes to reach the objective. Teams will have up to four minutes to complete the task with the maximum score being 120 points. | |

| **PART 2:** | **TIEBREAKER** |
|---|---|
| Teams may have up to 5 minutes preparation time before the light source is turned on and the score is determined. | Time in seconds team used to situate lasers and ask judge to turn on laser _____ |

**Start with: 120 points**

| Number of Mirrors used | Amount of points deducted | Check if yes | |
|---|---|---|---|
| 1 mirror used | Minus 30 points | | |
| 2 mirrors used | Minus 60 points | | **TOTAL POINTS** |
| 3 mirrors used | Minus 90 points | | |

**A perfect score of 0 is awarded to any team that uses all three mirrors to bounce the beam of light and hit the target.**

The distance from the target to the center of the laser beam will be recorded. This distance will be recorded along the length of the wall of the box, including any turns in the box between the target and laser. The distance will be recorded in centimeters.

**DISTANCE FROM THE LASER TO THE TARGET IN CENTIMETERS: _____**

**TOTAL (LOW SCORE WINS):**

| Number of seconds to complete part 1 (up to 120) | + | Number of mirrors used score | + | distance of laser point to target | = | Total |
|---|---|---|---|---|---|---|
| | + | | + | | = | |

Total Points: _____ Place _____

***Thank you to Seminole Science Charter School for the creation of this rubric.*

# 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 large, raw egg. The device containing the egg will be dropped from a fixed height to a target. **This is an ON-SITE BUILT EVENT. Teams will be required to build during the building construction period as shown on the published schedule prior to the start of all events. Teams will test their devices later in the day.**

**Number of Participants: 2** **Impound: NO**

**Construction:**

1. **The construction period will be the same for all teams at the same tournament. Teams will return throughout the day to test their devices according to the tournament's schedule. All teams must be present at the construction time.**

1. Each pair of students will be provided with **50** plastic non-flexible straws, one meter of one-inch masking tape, scissors, and one raw egg.
2. **The team must tell the event supervisor if their egg is cracked upon receipt during the construction time.**
3. **Height of the drop will be announced by the event supervisor at the start of the construction time. This may vary from tournament to tournament.**
4. The egg and package should be placed in a safe location between building and testing. Neither the egg nor the package should be touched by the Event Supervisors. Only the members of the team may touch the egg and the material before, during, and after the drop. **Note- in certain situations, for safety reasons, event supervisors may have to drop the package themselves. In these cases, it is up to the team to ensure that the egg is not cracked as it is handed off for testing.**
5. Students will have 20 minutes to construct a device to cushion the egg and prevent it from cracking or breaking.
6. After the 20-minute build time, teams must place all remaining building materials into the Ziploc bag and place it with the device and egg in a place noted by the Event Supervisor. The mass of the remaining building material will be used in the case of a tie. The team with the largest mass of left over building materials wins the tie.

**Testing:**

1. Teams will have 10 minutes to drop the entirety of the device all at once from a consistent height onto a target during their testing time. No tape may be attached to the egg.
2. There will be ONE drop per team from the prescribed height. Plumb lines are allowed during the competition.
3. Teams whose egg is unbroken after the drop will be ranked ahead of all teams whose egg is broken. Teams whose egg is broken before the official drop will drop the empty container and be ranked after all others. A an egg is defined as broken when it leaves a wet spot on a paper towel after being rolled across it. This rule is in place because it is possible for the shell to be cracked but the inner membrane intact.
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).

**Scoring**:

1. Low score wins.
2. Packages will be ranked in the following way:
    a. Tier 1: Eggs that do not break after dropping will be ranked first.
    b. Tier 2: Those that break in the drop will be ranked after those that do not.
    c. Tier 3: Teams whose egg breaks prior to dropping will be ranked after those that were not broken before testing. Teams that break the egg before dropping can be given a new egg for dropping.
3. The distance from the farthest edge of the container (or the farthest edge of any parts thrown from the container besides the egg) to the center of the target will determine the score. The package with the shortest distance wins.
4. Ties will be broken by the mass of the left over building materials. The highest mass of left over bag wins.

# TENNIS BALL CATAPULT

**Description:** Students will build and calibrate their own free-standing (not hand held) trajectory device that must be capable of "lobbing" a tennis ball at a target placed between 2 and 5 meters. Students MUST bring and wear impact-resistant **safety goggles. This is a PRE-BUILT EVENT.**

**Number of Participants: 2** **Impound: YES**

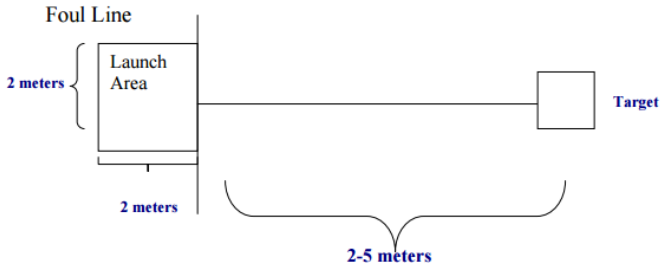
**The Competition:**

1. Prior to the competition, teams should **prepare a graph or data chart**, clearly labeled with the school and students' names, graph title, labeled x- and y- axes and graduated using appropriate units for usage of their device. Students should be prepared to answer questions about their device and graph. A bonus of minus 3 points may be awarded.
2. One graph should be submitted during impound. The graph may be used during competition time.
3. During impound, Event Supervisors will evaluate all devices for safety and determine if the device is suitable for testing.
4. Each team will bring their own homemade catapult or trebuchet and their own standard unaltered regulation tennis balls to the competition. Please print your team number prominently on the catapult. If the team fails to bring their own tennis balls, they may be supplied by the judge.
5. A data chart showing the launching characteristics of the catapult using various settings will be required for the competition.
6. Launch force must be provided by gravity or elastic solids (such as springs, rubber bands, etc.). The last point on the device touched by the tennis ball may not be more than 50 cm above the ground before, during or after starting. Total weight of device must be under 50 pounds.
7. Each device should be designed and built by the students (adult construction assistance is OK). Each device should be designed to operate safely at all times. No points will be awarded for design.
8. The device will sit on a level area of ground and fire at the target area that will also be at ground level. The target area will be a freshly raked sand pile of at least 1 meter in diameter. A small object level with the sand will mark the center.
9. The event may take place outside.

**Testing:**

1. Once the team is called to set up for testing, no coaching or support from outside is allowed.
2. Impact-resistant safety goggles (or glasses) are required during launch time. If team members do not where safety goggles while they are setting up and running their device, they will be given an initial warning and a penalty of +3 points. If a second warning is given, the team will immediately be disqualified and not allowed to compete.
3. Once teams enter the event area to compete, they may not leave the area or receive outside assistance, materials or communications until they are finished competing. Following an initial warning, a three-point penalty (+3) will be assessed per violation.

4. The distance from the "foul line" to the center of the target will be announced at the start of the competition. Students may place their catapult at any point behind the foul line up to 2 meters. See image below.




5. Total time once the team has placed their device into the Launch Area is 5 minutes. Each team will have a one-shot practice round after which they will shoot at the target three times. The first two shots will count toward the score. The third shot will only be used in the case of a tie.
6. Teams must give ample warning to the supervisors prior to launch. Warning may be "3,2,1 launching…" etc. Following an initial warning, a penalty of +3 points will be assessed for failure to warn supervisors before launch.
7. Only successful launches will be measured. Launches are successful when a Tennis Ball first bounce goes beyond the foul line. Only 3 shots fired are allowed, beyond the practice shot, regardless if they are successful or not.
8. The device may be moved by the participants within the 2-meter square launch area after each attempted launch. Teams may make adjustments to their device, between shots, while in the launch area using only materials that were impounded with the device. They may not change the device in any way that would violate impound rules.
9. The distance from the target will be measured after each shot, including the practice shot, and announced to the team to allow them to make adjustments based on their data chart.
10. The distance from the center of the target will be measured to the tennis ball's initial point of impact as determined by the supervisor. Tennis balls landing outside of the sand pile area, less than 10 meters from the launch area, will also be measured according to the initial point of impact as determined by the judge. Tennis balls hitting the target on initial impact will receive a score of zero.
11. No tennis balls should be shot before or during the catapult event except during the specified practice round or actual competition. Each team must bring their catapult to the competition site at a time posted at the registration table, and leave it there for safekeeping until their turn. This rule is meant to provide safety and fairness so teams will not be practicing during the day of the competition after the distance is announced.

**Scoring:**

1. Low score wins.
2. Score is the average of the distance from the target in meters, measured to a single centimeter precision for the first two trials. 1 meter is 1 point (i.e. 1.23 m)
3. Penalties may be assessed as listed in the rules.
4. Ties will be broken by the distance from target from the third trial.

# Tennis Ball Catapult Scoring Rubric

**School** _____ **Team Number** _____

**Scoring:**

1. Low score wins.
2. Score is the average of the distance from the target in meters, measured to a single centimeter precision for the first two trials. 1 meter is 1 point (i.e. 1.23 m)
3. Penalties may be assessed as listed in the rules.
4. Ties will be broken by the distance from target from the third trial.

## Impound:

| | Does the Catapult meet the requirements? (Y/N) |
|---|---|
| Tennis Ball Catapult at any point should not exceed 50 cm. | |
| The weight should not exceed 50 lbs | |
| Data chart presented bonus | |

***NOTE: If the Catapult does not make the requirements the students may launch but will be tiered below all legal catapults.**

## TEST:

Teams must give ample warning to the supervisors prior to launch. Warning may be "3,2,1 launching…" etc. Following an initial warning, a penalty of +3 points will be assessed for failure to warn supervisors before launch.

Tennis balls hitting the target on initial impact will receive a score of zero.

| Safety Goggle Initial warning | Safety Goggle Penalty Assessed | Disqualified for lack Safety goggles | Launch Warning Penalty Assessed | Outside Help Penalty Assessed |
|---|---|---|---|---|
| | | | | |

| Shot 1 Distance | + | Shot 2 Distance | ÷ | 2 | = | Average Score | | Shot 3 Distance |
|---|---|---|---|---|---|---|---|---|
| | + | | ÷ | 2 | = | | | |

Place _____

# TOWERS

**Directions:** This event is designed to test the student's ability to think on their feet. They 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 tennis ball at the top. This is an **ON SITE BUILD EVENT. Teams will be required to build during the building construction period as shown on the published schedule prior to the start of all events. Teams will test their devices later in the day.**

**Number of Participants**: 2 **Impound: NO**

**Event Parameters:** Each student on the team may bring 1 scissors, 1 ruler, and 1 pair of pliers. Teams may bring a tennis ball to use when building. No other materials, tools, notes or resources are permitted.

**The Construction:**

2. **ALL teams will construct their device at the same time. All teams must be present at this time.**
3. Each team of two students will be given a bag of building materials. All teams will receive the same materials. The materials might include: paper cups, drinking straws, paper clips, tape, string, etc. This list is only an example and the actual materials may be anything the event supervisor provides.
4. Materials will be provided in a large Ziploc baggie. This baggie is not used as part of the building and will be used to collect trash. All trash must be placed in the bag by the end of the build. Teams who do not clean up after their build will be penalized.
5. Each team will have a maximum of 20 minutes to construct a tower to support the tennis ball at a designated highest point. The top of the tennis ball must be higher than any part of the structure.
6. Only those materials supplied in the bag, not the bag itself, may be used to construct the tower. No other materials or adhesives may be part of the finished tower. Students may bring scissors, a pair of pliers, and a ruler. The event supervisor will not provide these items.
7. Teams may bring their own tennis ball to use while building their tower. However, all towers will be measured using the same tennis ball (regulation size and weight) provided by the Event Supervisor.
8. The tower must be completely free standing. It cannot be attached to the tabletop, floor, wall, or ceiling.
9. No coaching of the students will be allowed during the competition.
10. The team of students will have a maximum of 20 min. to construct the tower.
11. The students are to inform the supervisors when they finish their tower. The supervisor will notify the teams of where to place their completed tower until testing. Event supervisors and/judges should **not** touch the student towers. Supervisors should select a space for towers to be placed between testing that is not readily accessible to the public.
12. After building, teams are required to clean up their work area according to the directions of the event supervisor.

**Testing:**

1. Teams will return during their scheduled testing time. The event supervisor will tell teams where to bring their tower for testing.
2. They will place the tennis ball provided by the Event Supervisor at the top of their tower. The tower must remain standing long enough for the height and base to be measured, but at least 10 seconds.

**Scoring:**

Devices will be ranked according to the following rubrics:

1. **High score wins.**
2. The height of the tower and the widest width of the base will be measured as precisely as possible by the judges. Since no building materials are to extend above it, the top of the tennis ball will be considered the highest point of the tower. The width of the tower will be measured at the base. The largest diameter of the base will be recorded as the width
3. The score is the height of the tower from the base to the top of the tennis ball.
4. Devices that cannot support the tennis ball will be ranked in Tier 2. These devices will be ranked by the height of the tower, with the tallest tower receiving a higher score.
5. Teams who do not cleanup or follow other event supervisor directions will be ranked in Tier 2.
6. Ties will be broken by the base measurement. Smaller base measurements will be ranked higher.

# WATER ROCKETS

**Description**: Prior to the competition, teams will build a rocket propelled by air pressure and water out of a 2-liter plastic soda bottle. The rocket that stays in the air for the longest time will win. **This is a PRE-BUILT EVENT. Safety googles are required.**

**Number of Participants: 2** **Impound: YES**

**Construction:**

1. Water rockets will be impounded at the competition location during the impound window. Teams will have rockets in a box labeled with team names and team number. Repair kits are not impounded. The rocket must also have the team number printed on it using permanent marker.

2. The rocket fuselage/body must be made from a single clear, traditional plastic 2-liter soda bottle used to hold water and air pressure that propels the rocket when released.

3. The 2 liter bottle must have a neck/nozzle opening internal diameter of approximately 2.2 cm. Some water bottles have different diameters and heights and they cannot be accommodated on the launcher. Some also have extended necks, making it impossible to attach to the launcher.

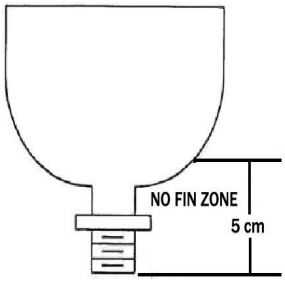
4. The bottle itself must not be altered in any way (e.g. holes, scratches, increasing the volume, restricting the bottle's opening). A safety check will be done to make sure that the bottle has not had any structural alterations due to physical, thermal, or chemical changes.

5. The rocket must not contain or be subject to any of the following: metal, commercial model rocket parts including the parachute, explosives, gases (except air), electronic devices, elastic, remote control, chemical or pyrotechnics, super glue (cynacrylate), or high temperature hot glue.

6. Fins, parachutes, and other items may be added to the outside of the bottle to increase the time aloft. Adhesives that may be used to attach components to the bottle are limited to tape and glue (only silicone, polyurethane-based, or others that do not damage the structural integrity of the bottle).

7. All parts and any changes must be attached **at a point that is** 5 cm **or more** horizontal and above the level of the bottle's opening. **No part of the rocket can intrude into this 5 cm zone.**

8. **The** nose of the rocket must be rounded or blunt **with a maximum curvature that matches that of a penny. It can be less curved than a penny (i.e. not as sharp) but it can't be more curved (sharper) than a penny.**




9. 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.

10. Only plain tap water may be used in the rocket. No other material 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.

11. Parts of the rocket may deploy during flight, but they must remain attached together by a string/lanyard.

**The Competition:**

1. Teams may bring repair kits containing tools, spare parts, and extra parachutes. Any parts found to be dangerous (ex. glass or metal), illegal (ex. commercially made rocket parts), or that prevent a rocket from 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 as long as this occurs before the close of the impound window. Rockets deemed unsafe according to the event supervisor's judgment will not be launched.

2. Two launches will be allowed. Different rockets may be used for each launch. Teams must use the water, launch pad, and source of pressure provided by the event supervisors. The team will add the desired amount of water to the rocket before each flight and may make alterations or repairs to rocket(s) between launches. Outside assistance/coaching from the sidelines is not permitted.

3. The event supervisors will supervise the pressurization of the rocket to **50 psi** and the launching of it. Students must not begin any action without explicit direction of the event supervisor. Anyone within 10 meters of a pressurized rocket must wear impact resistant safety goggles. Contestants may not hold their rocket during pressurization.

4. It will be the supervisors' decision whether the flight should be considered as unofficial due to variable weather conditions such as high winds.

5. Timing begins when the rocket separates from the launcher. Timing ends when any part of the rocket touches the ground, rests on an obstruction, or goes out of sight.

**Scoring:**

1. Highest time score wins.
2. The times of both flights will be added together to achieve a total time score.
3. Scores will be determined for the rocket by taking the average of the two event supervisors' times for the duration of each rocket's flight.
4. The watches will be started simultaneously at time of launch and stopped when the rocket touches the ground or any object in contact with the ground, trees, buildings, etc.
5. 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 in Tier 2 and then by their time aloft, behind all flights of rockets without construction violations and whose parts remain attached.
6. Teams whose rockets cannot be launched for any reason will receive participation points only.
7. Ties will be broken using the team's greater flight times. If a tie still exists, the lesser flight times will be compared, with more favorable rank going to the team with the higher flight time.

# Water Rockets

Raw Score: _____ Rank: _____

Team Number: _____ Tie? *What was the rank in the tie?* _____

Event Supervisor:_____ Team Name: _____

| Construction: | | |
|---|---|---|
| 1. Rocket was impounded on time | **Y** | **N** |
| 2. Constructed from a single 2 liter bottle | **Y** | **N** |
| 3. Bottle is not modified (scratches, holes, restricting opening, increasing volume) | **Y** | **N** |
| 4. Rocket does not contain restricted items | **Y** | **N** |
| 5. Adhesives are limited to tape or approved glues | **Y** | **N** |
| 6. All changes are above the 5 cm mark | **Y** | **N** |
| 7. Nose of rocket is round | **Y** | **N** |
| 8. Rocket does not exceed dimensions (22" x 11") | **Y** | **N** |
| 9. No other energy sources are contained in the rocket other than air and water | **Y** | **N** |
| 10. Which tier? Any item 1-9 with a N is Tier 2: | **Tier 1** | **Tier 2** |
| Competition: | | |
| 1. Rocket is safe to launch | **Y** | **N** |
| 2. Team does not receive outside assistance from parents or coaches | **Y** | **N** |
| 3. Team is wearing eye protection at all times during launch cycle | **Y** | **N** |
| 4. Rocket remained intact during flight | **Y** | **N** |
| 5. Which tier? Any item 1-4 with a N is a Tier 2: | **Tier 1** | **Tier 2** |
| Timing: | | |
| 1. Launch 1 | **Time 1** | **Time 2** |
| | | |
| Average | | |
| 2. Launch 2 | **Time 1** | **Time 2** |
| | | |
| Average | | |

**REFER TO SCORING SECTION IN THE RULES TO VERIFY ACCURACY AND INSURE THAT THE INTENT OF THE SCORING IS APPLIED CORRECTLY.**

Longest time aloft of the two launches = _____ Tier = _____

Rank is determined by time aloft in Tier 1, highest score wins. Teams in Tier 2 will receive a P for participation (last place of those teams that show up for the event).

# WEATHER PERMITTING

**Description:** This event will test the team's knowledge of conducting investigations and using appropriate technology to build an understanding of **Severe Storms.**

**Number of Participants:** 2 **Impound: NO**

**The Competition:**

1. Teams are allowed to bring **writing instruments** and a **3-Ring binder**, of any size, to the competition. The binder may contain any item, such as a book, computer generated printout, or student created paperwork. No electronic materials are allowed, such as a computer, calculator or smartphone. All materials must be securely bound inside the binder, so that when it is opened vertically (upside down) and given a light shake test no materials will fall out.

2. Event supervisors will provide all necessary items including maps, charts, data sets, materials, questions, and response sheets for participants.

3. The event may be run as a sit-down test or a station format. Teams will answer questions or complete tasks that assess any of the following topics:
   a. Water cycle (processes of evaporation, condensation, precipitation, and run-off)
   b. Weather instruments (thermometer, barometer, rain gauge, hygrometer, sling psychrometer, wind vane, anemometer, weather balloon, radar, satellite)
   c. Types of clouds and their relationships to weather conditions
   d. Using weather maps to identify weather conditions
   e. The following types of severe storms: blizzard, derecho, dust devil, flood, haboob, hail, hurricane, severe winter weather, thunderstorm, tornado, and water spout.
   f. Severe weather safety

**Scoring**: Points will be awarded for the accuracy of responses. Ties will be broken by the accuracy or quality of responses to pre-selected questions chosen by the event supervisor.