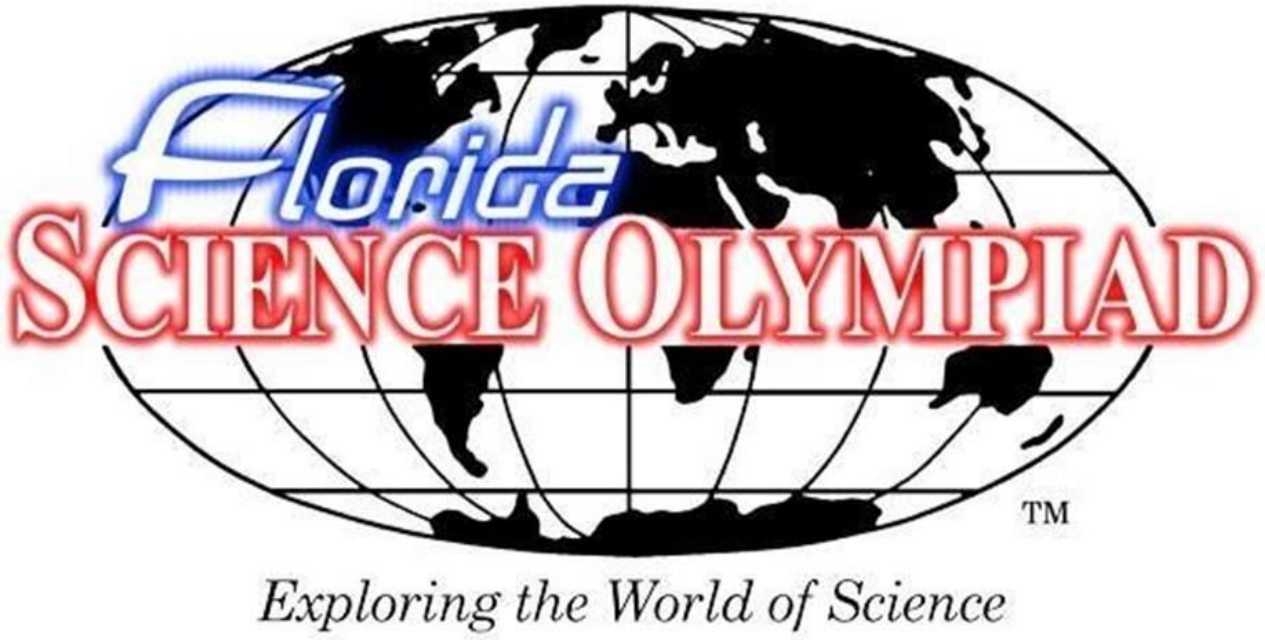


Official Rules Manual for the Southeast Elementary Science Olympiad at Florida Atlantic University

April 25, 2026

2026 ELEMENTARY (DIVISION A) SCHEDULE OF EVENTS--FAU Southeast Regional April 25, 2026

EVENT	*TENTATIVE* LOCATION	OPEN TO PUBLIC ?	8:00 - 8:50	9:00 - 9:50	10:00 - 10:50	11:00 - 11:50	11:50 - 12:30	12:30 - 1:20
Aerodynamics	NU 113	YES	ALL BUILD	Self Schedule			BREAK	Self
A Matter of Matter	PS 150	NO	NO TEAMS	01 - 06	07 - 12	13 - 18	BREAK	19 - 24
Can't Judge a Powder	PS 206	NO	NO TEAMS	07 - 12	13 - 18	19 - 24	BREAK	01 - 06
Chew the Fat	SC 116	NO	NO TEAMS	13 - 18	19 - 24	01 - 06	BREAK	07 - 12
Codebusters	SE 215	NO	NO TEAMS	19 - 24	01 - 06	07 - 12	BREAK	13 - 18
Crave the Wave	PS 239	NO	NO TEAMS	01 - 06	07 - 12	13 - 18	BREAK	19 - 24
Deep Blue Sea	SC 107	NO	NO TEAMS	07 - 12	13 - 18	19 - 24	BREAK	01 - 06
Fast Facts	SC 115	NO	NO TEAMS	13 - 18	19 - 24	01 - 06	BREAK	07 - 12
Metric Mania	SC 145	NO	NO TEAMS	19 - 24	01 - 06	07 - 12	BREAK	13 - 18
Mission Possible	SC 141	YES	NO TEAMS	Self Schedule			BREAK	Self
Mystery Architecture	SC 119	NO	ALL BUILD	Self Schedule			BREAK	Self
Rock Hound	SE 421	NO	NO TEAMS	01 - 06	07 - 12	13 - 18	BREAK	19 - 24
Tennis Ball Catapult	Sanson Lawn	YES	NO TEAMS	Self Schedule			BREAK	Self
Weather Permitting	SC 143	NO	NO TEAMS	07 - 12	13 - 18	19 - 24	BREAK	01 - 06
Write It Do It	BS 105/108	NO	NO TEAMS	13 - 18	19 - 24	01 - 06	BREAK	07 - 12

Blue = New Event For 2026

6:30 am - 7:30 am	Check-In for Event Supervisors and Volunteers	Sanson Patio
7:00 am - 7:45 am	Team Check-In	Sanson Patio
Approximately 3:00 pm	Awards Ceremony	Sanson Patio

GENERAL INFORMATION

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 for 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 the Science Olympiad competition 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 takes a facilitation role and accepts 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 **15** will prepare throughout the school year to compete in a Science Olympiad tournament. These inter-scholastic competitions consist of a series of approximately 15 team events that encourage learning in life science, earth science, chemistry and physics, scientific inquiry, technology, and engineering/design.

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 $180 ($210) fee for each 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 into 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. Generally, impound happens from 8:00 - 8:50.
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.
5. Chemistry/lab events require specific dress. Please check the manual to ensure that your students will be prepared to compete on the day of the tournament.

DIFFICULTY OF EVENTS: This is a competition, so expect that there will be questions on tests and tasks on labs that students may be unable to answer- competitors will be ranked and, therefore, we need a wide range of scores. Work with your students to understand that this is not a situation where they will know everything, and they should do their best. Tests/Labs are generally written at a 4th/5th grade level with a few questions below that level and a few questions above that level.

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 grounds for immediate disqualification of the entire team**. STUDENTS may arbitrate judging concerns using the arbitration process.
3. Parents and chaperones should not interact/argue with event supervisors/judges. There is an arbitration process that the STUDENT and coach should complete when concerns arise.
4. If a judge believes a parent has interfered or helped a student in any way, **this will be grounds 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 grounds 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/APPEALS:

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 violations, students may complete the arbitration process during the competition.

- Arbitration forma are available at the Help Desk.
- Arbitration forms 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. **These issues should be taken up with the supervisor during the event block in which something happened. We understand that might take a few moments out of your competition time, but these types of issues need to be solved in the event immediately.**

- 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.

AERODYNAMICS

DESCRIPTION: Teams will build on site paper airplanes using provided materials and test airplanes based on flight duration and accuracy through a target. **This is an On-Site Build event.**

COMPETITORS BRING:

- pencils/writing utensils
- Scissors (one pair per team)
- Ruler (one per team)

NUMBER OF PARTICIPANTS: 2 **IMPOUND: NO (ALL TEAMS BUILD ON-SITE)**

THE COMPETITION:

1. Teams will construct (on-site) paper airplanes designed to meet the goals outlined.
2. All teams will construct at the same time to avoid an unfair advantage to those that test first.
3. All teams will return at a later point in the day (as outlined by the schedule) to test their planes.
4. It is suggested that Event Supervisors set up at least two separate areas to test - one for Part 1 and one for Part 2. This will ensure that teams will have adequate time to test in the testing block.

CONSTRUCTION (20 minutes):

1. Each team member receives 2 pieces of copy paper, 2 paper clips, and 5 cm of masking tape and has 20 minutes to build their airplanes. Type/size of paper clip and width of tape will be consistent among all teams.
2. Each team member constructs his or her own airplane/s - using at least one sheet of paper. But not more than two, which will bear a resemblance to a winged object. No designs like a helicopter are permitted.
3. Teams will write their team number on each plane.
4. One team member's plane/s will be used in Part 1 with the goal being to have the plane in the air the longest. These planes should be labeled "Part 1".
5. The other team member's plane/s will be used in Part 2 with the goals of accuracy to hitting targets. These planes should be labeled "Part 2".
6. Team members should decide whose plane will be used for each part of the competition prior to testing time.
7. The event supervisor should notify teams of where to leave their planes for use during later testing. This location should be monitored so planes are not touched prior to testing.
8. It is suggested that the event supervisor/judge does not touch student planes and instead gives students instructions on where to place them.
9. Teams must clean up after themselves and may be placed in Tier 2 if the construction area is not clean.

TESTING Part 1 (Duration of Flight)

1. The goal of this part is for the airplane to stay in the air the longest amount of time.
2. Each plane is launched by hand by its maker from a predetermined starting point, which is the same for all teams. This starting point will be designated by a 1 meter square taped on the floor.
3. Teams should be prepared to launch within 60 seconds of being called upon.
4. Teams may choose to launch one plane at a time (two launches) or launch both planes at once in a "piggyback fashion" one launch
5. If two planes are used at once (in piggyback fashion), the scored time will be for the plane which is aloft for the longer duration.

6. There is no time provided for a test run - a maximum of two launches are allowed to get a maximum of two scores for aloft time. The greater flight time will count as the score for Part 1.
7. Launching team member must give a warning by calling out "3, 2, 1, Launch" or something similar at the time of launch. Failure to do so may result in the loss of the attempt. If this happens, the Event Supervisor should provide a reminder before the next attempt.
8. The time aloft will cease when:
    a. A plane becomes lodged in a permanent fixture (light, seat, etc)
    b. A plane touches the floor.
    c. The plane ceases moving in air or hits a hanging obstacle.

TESTING Part 2 (Accuracy of Flight)

1. The purpose of this part is for the airplane to fly accurately through targets and travel the longest distance.
2. The planes used in this part must be different from the planes used in Part 1 and should be made by the other team member than in Part 1.
3. Each plane is launched by hand by its maker from a predetermined starting point, which is the same for all teams. This starting point will be designated by a 1 meter square taped on the floor.
4. Teams should be prepared to launch within 60 seconds of being called upon.
5. Teams may choose to launch one plane at a time (two launches) or launch both planes at once in a "piggyback fashion" (one launch)
6. If two planes are used at once (ie. in a piggyback fashion), the accuracy score will be for the plane that goes through the most targets.
7. There is no time provided for a test run - a maximum of two launches are allowed to get maximum score.
8. Two to three targets made from hoops will be erected. Points will be awarded for each hoop through which the airplane passes during its flight.
    a. The hoops may be of any size (from hula hoops to ones constructed from flexible PVC) but must be stationary and not held by a person. For example, hoops can be held up using purchased hula hoop holders or holders made from a 2-liter bottle with rocks or sand that is attached to the hoop with PVC.
    b. The distance from the launch area to the initial hoop must be no greater than 4 meters and the distance to the final hoop should be no greater than **10 meters**.

DESIGN LOG:

Prior to the competition, teams should prepare a design log. The design log will be submitted during impound and should include:

a. Graphs or data charts compiled from flight practice for each part of the competition, graph title, labeled x- and y- axes and using appropriate units for usage of their practice flights.
b. The log should be clearly labeled with the team number.

SCORING:

1. **High score wins.**
2. **Scoring as follows:**
    a. **Score for Part 1 = Longest flight time in seconds X 10**
    b. **Score for Part 2 = 50 points for each target through which the plane passes (up to 3)**
3. **Tiebreaker = Quality of design log**

Team# _____ School Name: _____

Aerodynamics Scoring Sheet

BUILD:		TIER
1. Outside assistance violation?	**Yes= Tier 2**	
2. Planes made only of allowable materials?	**No= Participation points only**	
3. Planes have the team number and Part 1 or 2 on them?	**No= Tier 2**	
4.. Building area cleaned up as instructed?	**No = Tier 2**	
5. Both team members show up at build time?	**No= Participation points only**	
6. Team impounded a data chart?	**No = Tier 2**	

TEST:

Part 1: Duration of flight **Launch 1:_____seconds Launch 2:_____seconds** **Score will be 10 times the greater of the two launches.**	
Part 2: Points for flying through targets **Launch 1:_____targets Launch 2:_____targets** **Score will be given only for launch with the most accuracy.** **Teams will earn 50 points per target up to 150 points total.**	
Design Log: Used for tiebreak only.	
Total Testing Score=	

TESTiING VIOLATIONS:

1. Outside assistance violation?	**Yes= Tier 2**	
2. Design alteration violation during testing phase?	**Y= Participation points only**	
3. Launch made outside the designated point?	**Yes= Tier 2**	

Total Testing Score:_____Tier:_____Final Rank: _____

PLEASE NOTE THAT THIS RUBRIC IS A SAMPLE AND GUIDE- IN CASES OF CONFLICT WITH THE RULES, THE RULES TAKE PRECEDENCE OVER THE RUBRIC.

A MATTER OF MATTER

DESCRIPTION: Students will be asked questions or will conduct experiments at stations as they relate to the properties of matter. (Safety Goggles are required.)

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND:** NO

COMPETITORS BRING:

- Writing utensil;
- Safety goggles
- 3-ring binder of any size with any research/reference material. The binder may contain any item, such as a book, computer generated printout, or student created paperwork. No electronic materials are allowed. 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.

THE COMPETITION:

1. Each team will move from one station to another. There will be at least 4 stations.
2. Team will either be asked questions or will be required to complete experiments or make observations as they relate to the properties of matter.
3. The topics that may be tested or in which an experiment may be conducted include but are not limited to:
    a. Compare and contrast the physical properties of matter (solids, liquids, and gases) such as mass, shape, volume, color, texture, temperature, attraction to magnets, and hardness
    b. Describe the changes water undergoes when it changes state through heating and cooling (such as melting, freezing, boeing, evaporation, and condensation)
    c. Describe the differences between mixtures, solutions, and compounds
    d. Identify solutes, solvents, and solutions from given examples
    e. Describe or be asked to separate a given set of mixtures, or solutions using materials provided by the event supervisor
    f. Determine what will affect the rate of a solid dissolving in a liquid,including temperature, concentration, agitation rate, particle size, that can be tested in a lab. Pressure will not be tested.
    g. Identify physical versus chemical changes or conduct an experiment to identify and measure the changes

SCORING:

1. **High score wins**
2. Each question or station will be assigned a predetermined set of points by the event supervisor and communicated to teams
3. Ties will be broken by predetermined tie-breaker questions which are communicated to teams

CAN'T JUDGE A POWDER

DESCRIPTION: Students will test and characterize one pure substance and then, based only on the data they collect, answer a series of questions about that substance. Students will NOT be asked to identify the substance. The emphasis of the event is on the quality of the data collected, answering questions about the powder, and providing data to support their answers.

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND:** NO

SAFETY PARAMETERS:

Proper lab safety precautions MUST be used.

- Participant dress for the event must include close-toe shoes, long pants, and long sleeve shirt (or lab coat).
- Participants must wear safety goggles
- Participants should have a lab coat or apron.
- Shoulder length hair must be tied back.
- Taste testing is strictly prohibited.
- Students must wash their hands prior to leaving the event.

COMPETITORS BRING:

- Writing utensil;
- 2 copies of "Powder Properties Chart" (1 will be turned into the supervisor)
- Calculator
- Gloves (optional)
- Safety goggles (NOTE- See appropriate dress requirements above)

THE COMPETITION:

EVENT PARAMETERS:

1. Students will be collecting data on ONE unknown powder. Powders are limited to: granulated sugar, salt, flour, cornstarch, baking soda, calcium carbonate (chalk), or powdered Alka-Seltzer ©
2. The supervisor will provide the following tools for data collection:
    a. Vinegar
    b. Iodine
    c. Water
    d. 2 different writing instruments (2 different colored pens)
    e. Waste container
    f. Well plate/spot plate
    g. Hand lens
    h. Pipettes
    i. Paper towels
    j. Balance/scale
    k. Other equipment (ex. Hot plate, microscope, probes, pH paper, etc.)

POWDER PROPERTIES CHART:

1. Prior to the tournament, students will create a "Powder Properties Chart" that has information describing the physical and chemical properties of each possible powder in this event. This may be a table that lists each powder and describes the

properties. ONE sheet of 8.5 X 11" paper with notes (handwritten or printed) on both sides or **2 sheets of 8.5 X 11" paper with notes (handwritten or printed) on a single side**

2. One copy of the "Powder Properties Chart" will be provided to the supervisor upon entry into the event. The other copy may be used during the event.
3. The quality of the "Powder Properties Chart" will be used as a tie-breaker.

THE COMPETITION:

1. Teams will be given a sample of 1 powder and this will be the same for all teams. Teams will use the tools to collect data on this sample.
2. Teams will be provided approximately 30 minutes to complete relevant tests using the materials provided. The tests performed are determined by the competitors and NOT the supervisor. Some examples of data collected from tasks performed may be:
    a. The density of the sample is 30 g/mL
    b. The sample bubbles when mixed with vinegar.
    c. The powder sample has a shiny luster.
    d. The pH of the vinegar was 3.
    e. The temperature of the water was 30^{o} Celsius.
3. Data is to be recorded ONLY in Column 1 using the pen provided by the supervisor.
4. Each observation should have its own row- if you need more space, go to the next row and indent.
5. Data collected should be neat and organized. Any mistakes should be neatly crossed out.
6. Teams should record observations and not inferences. Inferences will score less points than observations.
7. After 30 minutes, teams will be expected to have their station clean and ready to move on.
8. For the second part, the sample will be removed from students and no further testing may be completed.
9. The supervisor will provide the competitors with a list of questions and another color pen. Teams will NOT have access to these questions during part 1.
10. For this section, the ability to answer the questions provided by the supervisor will be dependent on the quality and thoroughness of the data collected during the investigation period. Questions will have answers that derive from student observations.
11. For each question, the competitor will find the answer on their observation sheet. If the team has sufficient data or observations to support the answer to the question, the participant should write ONLY the question number in Column 2 next to the proper observation.
12. Each question/observation match will have a point value of 5 points. The number of points will be awarded depending on the quality of the data and/or observation. Inferences can be awarded at most 3 points.
13. Topics for questions may include, but are not limited to:
    a. Solubility and reactions with water
    b. Density
    c. Reactions with vinegar
    d. Reactions with Iodine
    e. Crystal properties
    f. Mass
    g. pH
14. Some **example** questions
    a. Is the substance soluble in water?
    b. Was there a reaction that occurred when the sample was mixed with water?
    c. How does the density of the sample compare to the density of water?
    d. Does the substance react with vinegar to produce a gas?

SCORING :

1. **High score wins.**
2. Scoring is based on the sum of the point value of each question/observation match that was correctly identified in Column 2 of the answer sheet.
3. Ties are broken by the quality of the "Powder Property Chart".
4. Teams who do not have proper safety equipment cannot compete. The team should be warned and allowed to correct the safety issue. They may leave to find someone to lend them the equipment but will not receive any time back to make up for lost time. Supervisor may provide safety equipment, if available, but there will be a penalty of 10% given. This penalty is taken off the overall score that the team gets.
5. A penalty of 10% will be given if the lab station is not cleaned up as instructed by the event supervisor at the end of the event.

CAN'T JUDGE A POWDER OBSERVATION SHEET TEAM #: _____

COLUMN 1:

- You have 30 minutes to write as many observations as possible.
- Write only ONE observation per line. If your observation does not fit on one line, indent the next line and continue.
- The station must be cleaned by the end of this section. Not cleaning up will result in a penalty.

COLUMN 2:

- Do not write in column 2 until told to do so.
- After you have cleaned up and completed Column 1, you will have 15 minutes to complete this section. The question sheet provided by the supervisor is for reference only.
- In column 2, write the QUESTION number that you are answering.

COLUMN 1: OBSERVATIONS	COLUMN 2: TEST

COLUMN 1: OBSERVATIONS	COLUMN 2: TEST

Penalty assessed for: _____

SCORE: _____
PENALTIES: _____
TOTAL SCORE: _____
FINAL RANK: _____

CHEW THE FAT

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

COMPETITORS BRING:

- Pencil/writing utensil;
- 3-ring binder of any size with any research/reference material. The binder may contain any item, such as a book, computer generated printout, or student created paperwork. No electronic materials are allowed. 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.

NUMBER OF PARTICIPANTS: 2 **IMPOUND:** NO

THE COMPETITION:

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

1. 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 different nutritional components in foods.For example:
        a. fats and oils using the paper bag test and to discover which foods contain high amounts of fats and oils.
        b. Iron using a magnet in ground up breakfast cereals
        c. Starch in foods using the iodine test
    5. 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).
    6. 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.
    7. Understand the relationship among the amount of food energy (calories) consumed, weight, and metabolism.

SCORING:

1. **High score wins.**
2. Points will be awarded for the accuracy of responses.
3. Ties will be broken by the accuracy or quality of responses to pre-selected questions chosen by the event supervisor.

CODEBUSTERS

DESCRIPTION: Teams will cryptanalyze and decode encrypted messages using techniques for historical and advanced ciphers.

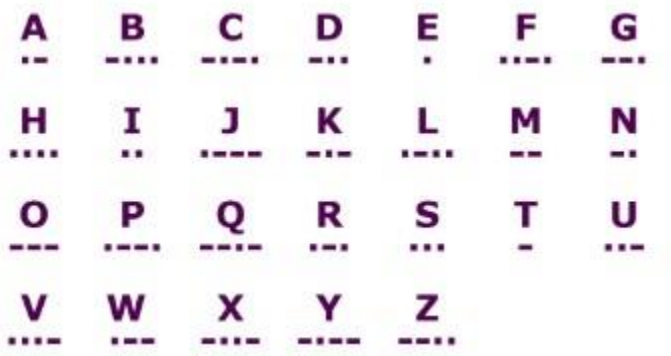
COMPETITORS BRING:

- Pencil/writing utensil;

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND: NO**

THE COMPETITION:

1. This event consists of participants using cryptanalysis techniques and ciphers to decrypt and encrypt messages on a written or computer-based exam.
2. Teams will be provided scratch paper and any tables needed for the questions on the exam.
3. The code types that can be used include:
    a. Caesar's cipher- a substitution cipher in which each letter in the plaintext is replaced by another letter some fixed positions down the alphabet. For example, with a left shift of 3, D would be replaced by A, E by B, etc.
    b. Atbash – a monoalphabetic substitution cipher where the alphabet is mapped to its reverse, so that the first letter becomes the last letter, the second letter becomes the second to last letter, etc.
    c. Morse Code - a system for representing letters of the alphabet, numerals, and punctuation marks by an arrangement of dots, dashes, and spaces. The Event Supervisor must provide a Morse Code table to students on the test.

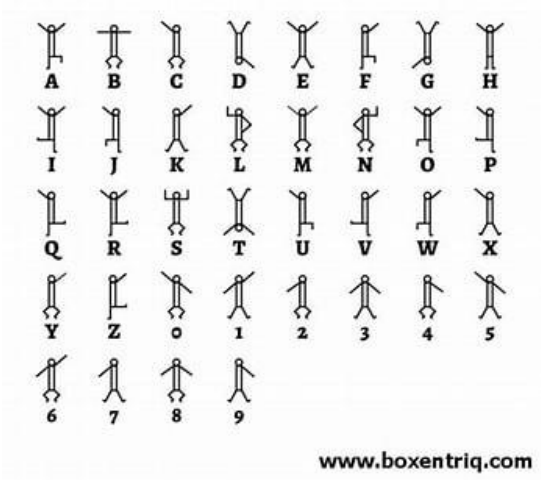


    d. Tap Code- Encode text messages on a letter-by-letter basis in a very simple way. The message is transmitted using a series of tap sounds. In this case, the sounds will be shown as dots. The Event Supervisor must provide the "Latin alphabet tap code table" to participants in the test.

Latin alphabet tap code table

	1	2	3	4	5
1	A	B	C/K	D	E
2	F	G	H	I	J
3	L	M	N	O	P
4	Q	R	S	T	U
5	V	W	X	Y	Z

e. Dancing Men Cipher- The Dancing Men alphabet is a cipher created by Arthur Conan Doyle in 1903, and used in his Sherlock Holmes short story "The Adventure of the Dancing Men". The event supervisor must provide a Dancing Men Cipher table to students on the test. **The event supervisor may include the use of flags within the cipher or not.**



4. The code that is to be used should be identified in the question. For example, "Solve this Caesar Cipher which is a quote by Enola Holmes and starts with a shift of 5" or "Albert Einstein left a message using the Tap Code cipher. What does it say?"
5. No more than 1/3 of the questions will require encryption, other questions will be decryption questions.
6. Questions may provide improperly decoded sample answers and require students to "debug" or provide the correct answer and an explanation of where the original decoder went wrong.
7. Supervisors will identify a "Timing Bonus" question. This question may be completed with a judge/supervisor at a separate station while the rest of the teams are completing the paper/pencil test OR should be the first question in the test. In this case, the "Timing Bonus" question should be a separate sheet of paper only provided when the team is called to that station.
8. Questions should be given point values that correspond with the number of letters in the plaintext and/or the difficulty of the problem. (see scoring information below)

SCORING:

- **High score wins.**
- Each question will be assigned a predetermined set of points, assigned by the event supervisor and communicated to the teams (preferably- points are identified on the test/station paperwork).
    - For questions such as cryptograms, with answers composed of letters, the final points will be determined based on the number of correct letters from the decoded plaintext or the encoded ciphertext.
- A timing bonus is earned based on the number of seconds it takes a team to correctly decode/encode the identified question. Students will earn the number of points for the question itself and for the timing bonus.
- Ties will be broken with predetermined questions as identified by the supervisors.

CRAVE THE WAVE

DESCRIPTION: In this event competitors must demonstrate knowledge and process skills needed to solve problems and answer questions regarding all types of waves and wave motion.

COMPETITORS BRING/NEED:

- Writing utensil;
- 3-ring binder of any size with any research/reference material. 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.
- Protractor
- Ruler
- 2 calculators

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND: NO**

THE COMPETITION:

1. The competition must consist of both hands-on tasks and written questions related to waves.
    A. 25-50% of the score must be from the practical portion (hands-on tasks)
    B. 50-75% must be from the theoretical portion (written questions)
2. The event supervisor may provide some mathematical relationships, but the competitors are expected to demonstrate an understanding of the concepts outlined below.
3. The competition must consist of at least one task/question from each of the following areas:
    A. General wave characteristics (e.g., wavelength, amplitude, frequency, period)
    B. Wave types (e.g., transverse, longitudinal, surface, torsional)
    C. Earthquake/seismic waves (e.g., p-waves, s-waves, Rayleigh waves, Love waves, surface waves)
    D. Illustrating that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors
    E. Observing and explaining that light and sound waves can be reflected, refracted, and/or absorbed.
    F. Electromagnetic spectrum (e.g. order, usage, visible light)

SCORING:

- **High score wins.**
- Each question or station will be assigned a predetermined set of points by the event supervisor **and communicated to the teams.**
- Ties will be broken with pre-determined tie-breaker questions **which are communicated to teams.**

DEEP BLUE SEA (Intracoastal Flora and Fauna)

DESCRIPTION: Teams will be assessed on their knowledge of oceanography, the flora and fauna of the Atlantic Ocean, and aquatic animal life cycles.

COMPETITORS BRING/NEED:

- Writing utensil;
- 3-ring binder of any size with any research/reference material. 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.

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND: NO**

THE COMPETITION:

1. **The competition may include timed stations and/or timed slides/PowerPoint presentation(s).**
2. In **Part I** the contestants will view pictures and answer questions relating to identifying **Intracoastal Waterway flora or fauna.** They may also be asked questions about the **Intracoastal Waterway organism's habitat, diet, or life cycle.**
3. The list of flora and fauna will come from the following list:

FLORA:

Turtle Grass
Manatee Grass
Smooth Cord Grass
Sawgrass
Salt Meadow Cord Grass
Big Cord Grass
Widgeon Grass
Red Mangrove
Black Mangrove
White Mangrove
Bald Cypress
Sable Palm
Black Tupelo
Red Maple
Saltwort
Annual Glasswort
Perennial Glasswort
Sea Purslane
Black Needle Rush

FAUNA:

Brown Pelicans
American White Pelican
Roseate Spoonbill
Wood Stork
White Ibis
Green Heron
Great Blue Heron
Great White Heron
Osprey
Great Horned Owl
Barn Swallow
Anhinga
Belted Kingfisher
American Oystercatchers
Reddish Egret
Snowy Egret
Roseate Tern
Atlantic Bottlenose Dolphin
West Indian Manatee
American River Otter
American Alligator
Green Sea Turtle
Loggerhead Turtle
Hawksbill Turtle
Atlantic Salt Marsh Snake
Fiddler Crab
Yellow-Bellied Slider
Red-Eared Slider
Common Snapping Turtle
Redfish
Spotted Sea Trout
Snook
Tarpon
Spanish Mackerel
Sheepshead
Pompano
Flounder
Black Drum
Largemouth Bass
Striped Bass
Gray Snapper
Crevalle Jack

4. 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, longshore currents, etc.)
    c. Geography (location and identification of oceans, seas, major bays, etc.)
    d. Conservation efforts to protect ocean animals and sea floor

SCORING:

- **High score wins.**
- Each question or station will be assigned a predetermined set of points by the event supervisor **and communicated to the teams.**
- Ties will be broken with pre-determined tie-breaker questions **which are communicated to teams.**

FAST FACTS (Space)

DESCRIPTION: Teams will fill in a grid of terms that begin with a given letter to match given science categories related to space.

COMPETITORS BRING/NEED:

- Writing utensil

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND: NO**

THE COMPETITION:

1. Teams are not allowed to bring any information resources or other material into the event.
2. The event supervisor will provide each team answer/scoresheets.
3. Each competition will consist of four rounds. Each round will begin with the supervisor giving each team the same scoresheet that contains a grid which has 5 different science categories listed along the horizontal axis and 5 different letters listed along the vertical axis. The supervisor will determine the categories to be used in each round, ensuring that there is at least one valid answer for each category/letter combination. Categories must not be repeated within a grid or among the four grids used in competition. No letter can be repeated more than twice within the four grids.
4. Teams will have 6 minutes to complete each round. Teams will write a term, corresponding to the given category and beginning with the given letter, in each of the 25 boxes of the grid. At the end of 6 minutes the event supervisor will stop the round. For each round all students should start and stop writing at the same time as directed by the event supervisor. Students beginning before or working after the event supervisor starts/stops the round will have their scoresheet not scored for that round.
5. Students are to write their names and team number on the scoresheet for each round. A scoresheet without student names and/or school will not be scored for that round.
6. At the end of each round the supervisor will collect all scoresheets. Then a new set of scoresheets will be distributed to students. This will repeat for each of the three rounds.
7. Names of the categories must not be used in the answer.
8. If a correct response has more than one word, the first letter of the first word will be used (e.g., "D" is the first letter of "Doppler Radar"), Exceptions: the first letter of of a word following articles, "the", "a/an" will be considered the first letter of the term (e.g., "The Grand Canyon" would be considered to begin with "G".)
9. Students may not write two or more different forms of a response within a category to get credit for two or more different answers (e.g., Category - "Human Organs", Letters "I", "L", "S", and the student writes "small intestine", 'large intestine", and "intestine". The student would only get credit for the more precise terms "small intestine" and "large intestine".
10. Incorrect spelling of words will be allowed if the event supervisor is able to determine the intended term. However, the first letter must be correct. All words must be found in an English based science dictionary.

SCORING:

- Total score will be determined by adding the scores from each row and column from each of the four rounds. Highest total score wins.
- The number of points earned depends upon the number of correct terms listed in a row and in a column. Points will be awarded as follows:
    - One correct term in a row = 1 point
    - Two correct terms in a row = 4 points
    - Three correct terms in a row = 9 points

    - Four correct terms in a row = 16 points
    - Five correct terms in a row = 25 points
    - One correct term in a column = 1 point
    - Two correct terms in a column = 4 points
    - Three correct terms in a column = 9 points
    - Four correct terms in a column = 16 points
    - Five correct terms in a column = 25 points
- Ties will be broken in the following sequence
    - Highest individual round score
    - Second highest individual round score
    - Most columns/rows with 5 correct answers
    - Most columns/rows with 4 correct answers
    - Most columns/rows with 3 correct answers
    - Most columns/rows with 2 correct answers

METRIC MANIA

DESCRIPTION: Teams will demonstrate their understanding of metric measurements by estimating and measuring length (meter), mass (gram), fluid volume (liter), angles, and temperature (Celsius) and making calculations based on these measurements.

COMPETITORS BRING:

- Pencil/writing utensil;
- Calculator, metric ruler, protractor

NUMBER OF PARTICIPANTS: 2 **IMPOUND:** NO

THE COMPETITION:

1. The event may be run as a set of stations or a test that should include at least one hands-on task.
2. In addition to the tools that the teams may bring, supervisors may be provide the following tools to be used during the event:
    a. Meter stick/meter tape
    b. Electronic or triple beam balance
    c. Beakers
    d. Erlenmeyer flasks
    e. Graduated cylinders
    f. Caliper
    g. Thermometer
3. Questions/tasks may relate to the following topics:
    a. Scale of metric units (ex. 10 mm = 1 cm)
    b. Appropriate units to measure various items, or for calculations
    c. How to make measurement estimations
    d. Drawing and identifying lines and angles
    e. Analyzing shapes based on lines and angles
    f. Measuring and calculating volume of rectangular prisms, liquid in a container, irregular objects using displacement
4. Hands-on activities may include, but are not limited to:
    a. Given a protractor, draw and label a 58^{o} angle (angle ABC) and classify the angle as obtuse, acute, or right
    b. Use two blocks at the station and measure the mass and volume of each.
    c. Given a pencil, estimate how many pencils would be in a pile that had a mass of 10 kg.
    d. Use a caliper to measure the outside diameter of a ring and then the thickness of the metal ring in mm.

SCORING:

- **High score wins.**
- Each question or station will be assigned a predetermined set of points, assigned by the event supervisor **and communicated to the teams.**
- Ties will be broken with pre-determined tie-breaker questions which are communicated to teams. Supervisors may use the time needed to complete a task as a tiebreaker, if that is communicated to teams prior to the event.

MISSION POSSIBLE

DESCRIPTION: Teams will design, build, test and bring a Rube Goldberg-like device which incorporates up to 12 unique Action Transfers and uses five forms of energy in accomplishing a given task in 60 seconds. Devices will be constructed prior to competition. This is a **PRE-BUILT EVENT.**

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND:** Yes

COMPETITORS BRING:

- Device
- 2 copies of the Action Sequence List (ASL)
- Safety goggles
- Any materials needed to repair device

THE COMPETITION:

CONSTRUCTION:

1. GENERAL REQUIREMENTS:
    a. The device must fit inside an imaginary box 75 centimeter long, 75 centimeter wide, and 1 meter high and must fit through a single door opening. Devices not meeting these requirements will be placed in Tier 2.
    b. The device may use ambient room light and 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.
    c. Students must be able to move the device from one location to another (from impound to testing).
2. SCORABLE ACTIONS:
    a. Start Action: (20 Points) - The device will be started by some action of the team such as switching a switch, pushing a button, dropping an object, etc. This should be clearly identified on the ASL for points.
    b. Scorable Actions: (10 points each for a total of 120) - each scorable action needs to initiate the next scorable action.
        i. Use a 3:1 gear system to initiate an action
        ii. Use a wheel and axle to raise an object at least 10 cm vertically, that object should then initiate an action
        iii. Transfer gravitational potential energy to kinetic energy to initiate an action
        iv. Use chemical energy to initiate an action
        v. Knock over a series of at least 5 free-standing, commercial dominoes, the last of which initiates an action
        vi. Use a pulley system to raise an object at least 10 cm vertically, that object should then initiate an action
        vii. Push or pull an object up an inclined plane to initiate an action
        viii. Use wind energy to initiate an action
        ix. Use electrical energy to initiate an action
        x. Pull a wedge from underneath an object to initiate an action
        xi. Blow up a balloon and use that to initiate an action
        xii. Use a wheel and axle to move an object at least 10 cm horizontally, that object should then initiate an action
        xiii. Actions must be designed to contribute to the final action and should be consecutive. Actions that are parallel or dead-end actions will not count for points.
        xiv. Scorable actions cannot be combined and should be identified on the ASL. For example, if you use a funnel to transfer gravitational energy to kinetic energy, the team must identify which of those is scorable. Energy sources (i.e. springs, mousetraps) must be set prior to starting the device in the 5 minute maximum set up time.
        xv. Heat energy may be used but must not have a flame
        xvi. No electric device may have or use an electric potential difference of more than 9 volts.

xvii. If electric devices used for heat are rechargeable, documentation must be submitted to confirm output is no more than 9 volts.

c. Final Action: (20 points) Teams will design the device to complete the final task of raising a flag, at least 2 cm, at the end of 60 seconds. There are no specific requirements on the flag, but it should look like a flag.

3. ACTION SEQUENCE LIST (ASL)
   a. Teams will use the template provided to create an Action Sequence List corresponding to their device.
      ESO Mission Possible Action Sequence List 25-26.docx
   b. Teams must submit TWO copies of the Action Sequence Lists (ASL) to the Event Supervisor during impound.
      i. Your ASL must describe the sequence in which the Action Transfers will occur (this must include a brief description, not just a list)
      ii. Your ASL must indicate the Form of Energy used in each action
      iii. Your ASL must be no more than on 8.5X11 inch page single-sided
   c. The ASL may be kept by the supervisor for use in scoring and/or score counseling.
   d. Link to ASL template. Be sure to save a copy so that you can edit the document.
      ESO Mission Possible Action Sequence List 25-26.docx
   e. Teams without an ASL will be placed in Tier 2.

THE COMPETITION:

1. IMPOUND:
   a. All devices must be impounded during the indicated impound time. Teams who do not impound may not be allowed to compete or will be placed in Tier 2 based on the supervisor's discretion.
   b. Adults may be able to help with impound but will not be able to assist during testing blocks. Teams should ensure that students are able to move their device from the impound location to the testing location. If adults enter the testing area, the team may be placed in Tier 3.
   c. Each device must pass a safety inspection BEFORE operation. Uncontrolled or hazardous non-shielded, falling off launch objects, hazardous materials or spills, hazardous flammable substances, faulty wiring, or any other potential hazard can result in being unable to compete and earning only participation points for the event (Tier 3)
   d. Two copies of the ASL will be impounded with the device.
   e. Teams should impound goggles for use during testing.
   f. The team must also impound any materials which may be needed during the testing process or to repair the device. No other materials will be allowed.
2. COMPETITION:
   a. The event will be held indoors.
   b. Teams will have a maximum of 5 minutes to move and reset their device for testing. Teams will earn a bonus of 20 points if they start their device within 2 minutes of their competition time.
   c. Within 5 minutes of their competition time, the team will notify the supervisor that they are ready to test. Students must have their goggles on to begin the run. Teams who do not have goggles will be given one warning and allowed to get goggles but their 5 minute time will not be stopped. Teams without goggles will be placed in Tier 2.
   d. The team must follow the directions of the supervisor to start the device.
   e. Teams should not touch their device unless the device stops, jams, or fails. In that case, the participants are allowed to touch/adjust it to continue operation. Participants do not need to wait for the event supervisor's permission but should notify the supervisor of the restart.
      i. Teams will lose 10 points for each restart needed during the run with a maximum of 3 restarts allowed before time is called on the run.
      ii. Obvious stalling or adjusting only to impact runtime will result in disqualification (Tier 3).
   f. Teams will be allowed to run their device only one time.

g. Run time ends when:
    i. The final task is complete
    ii. The device has been restarted 3 times and stops (Time will be recorded as 2 minutes and only successful scorable actions will be awarded points)
    iii. Two minutes have passed

SCORING :

1. **High score wins**
2. The Action Score will be calculated using the following:
    a. 20 points for a starting action
    b. 10 points for each scorable action
    c. 20 points for final action
3. The runtime score will be 60 points minus 1 point for each second below or beyond the 60 second target time.
4. Bonus points will be awarded for early start as stated above.
5. Ties will be broken by the quality/accuracy of the ASL.

MYSTERY ARCHITECTURE

DESCRIPTION: At the beginning of the event, teams will be given a bag of building materials and instructions for designing and building a device that can be tested. This is an **ON-SITE BUILD EVENT.**

NUMBER OF PARTICIPANTS: Maximum of 3

IMPOUND: NO but all teams will build at the same time.

COMPETITORS BRING:

- Writing utensil;
- Scissors;
- Ruler;
- Safety goggles

THE COMPETITION:

BUILD:

4. All teams will build at the same time. Teams will have 25-minutes to build. Once teams enter the area to build, they may not leave the area or receive outside assistance, materials, or communication until after they are finished building. Violation of this rule places a team in Tier 2.
5. Once participants arrive at their build area, they must put their safety goggles on. These goggles must stay on for the entire build period. Supervisors will give one goggle warning**.** Additional warnings will place the team in Tier 2 and/or remove them from competition.
6. Each team will be given a bag containing the same materials and a working area.
    a. Examples of materials are: paper cups, drinking straws, paper clips, string, tape, paper, Play Doh ©, and Popsicle sticks. Materials are not limited to this list but will not include anything potentially hazardous.
    b. Teams may not use any outside materials, other than what is provided to them by the event supervisor or their scissors and ruler.
    c. The bag that the materials come in cannot be part of the package and should be used to hold all waste at the end of the build.
    d. The materials provided may be altered as needed, using the allowable tools.
    e. The allowable materials (scissors, pencil, ruler) may NOT be part of the package.
7. The team will create a device based on the instructions of the supervisor. The information will be provided during the morning build time.
    a. Samples of devices to be built are limited to a tower, a bridge, a floatation device such as a boat, or a cantilever.
    b. The supervisor's directions must include at least one primary dimension and must include whether the device must support a load and the duration of the load supported. This must be provided prior to building and must be the same for all teams. Sample directions may be:
        i. Build the tallest tower that is freestanding for at least 30 seconds when a tennis ball is placed on top.
        ii. Build the shorte**s**t bridge that spans at least 30 cm and can hold a load of at least 500 g for a minimum of 10 seconds.
        iii. Build the longe**s**t cantilever that attaches to a given backpiece at the provided hook. This cantilever will hold 500 g for a minimum of 10 seconds.
        iv. Build the smallest floatation device that can holds a specific mass of marbles for a minimum of 10 seconds.
    c. If the device is to support a load, a separate and identical load of the same dimensions and weight used for testing will be provided for teams to view and feel. Teams may not take the sample load back to their building location.
    d. Unless specifically stated by the supervisor, devices must be freestanding and must not be attached to a tabletop, floor, ceiling, or other support.

e. Any loading should be able to be completed and device ready to test within 1-minute of the testing time.
f. The device must have the team number on it. Devices without team numbers will be placed in Tier 2.

8. At the end of the build time, teams must clean up their build area by placing all trash and extra materials in the bag.
    a. The remaining supplies will be massed and this will be used as a tie-breaker (those with more supplies left over will place higher in the tie).
    b. Prior to leaving the build area, teams must ensure that their area is clean and all instructions have been followed. Failure to follow this rule will place teams in Tier 2.
    c. Teams should store their devices in a location noted by the event supervisor. It is suggested that the event supervisor/judges do not touch student devices and instead have them place them in a location that will be monitored throughout the day.

TEST:

3. Teams will return to test at some point later in the day- this may be via self-scheduling or based on a set schedule.
4. Once participants arrive at their test area, supervisors will have them collect their device and give instructions for measuring the primary dimension and the mass of the waste baggie. This will be noted on the score sheet.
5. Teams will them be provided the load, if applicable, and they have 1-minute to load and call for timing to begin. Teams who cannot test within 1-minute will earn only Participation point**s.**
6. Teams whose device cannot hold the load will earn Participation poin**ts.**
7. The supervisor/judge will time to determine if the device was able to hold the load for the minimum time requirement. Teams whose devices cannot hold the load for the minimum time but whose devices hold the load will be placed in Tier 2.
8. Teams have one chance to test their device. There are no trial runs or do-overs.
9. Teams will remove the load according to the supervisor's instructions and return their device to the location where they are being stored. Teams may pick up devices at the end of the day, if desired.

SCORING :

6. **High or low score wins depending on instructions.**
7. The primary dimension will be measured to the nearest 0.1 cm by the event supervisor. Devices will be ranked as follows:
    a. Devices that held the load for the duration will be ranked in order of the primary dimension. (ex. If the instructions are to build the shortest bridge that spans 30 cm and holds 1 kg, the bridges will be ranked with the shortest bridge being in 1st place and the longest bridge in last place for this tier)
    b. Devices that held the load but not for the duration will be ranked within Tier 2 in order of primary dimension.

Team# _____ School Name: _____

Mystery Architecture Scoring Sheet

BUILD:		TIER
1. Outside assistance violation?	**Y= Tier 2; Repeated violations may result in DQ**	
2. Safety goggles violation?	**1 st time= Warning; 2 nd time = Tier 2; Repeated violations may result in DQ**	
3. Device made only of allowable materials?	**N= Participation points only**	
4f. Device has team number on it?	**N= Tier 2**	
5b. Building area cleaned up as instructed?	**N = Tier 2**	
Team did not show up at build time?	**Y= Participation points only**	
	TIER?	

TEST:

Primary Dimension: _____	Measurement:	_____
Mass of bag with "waste"	g (TIE-BREAKER)	
3. Loaded within 1-minute?	**N= Participation points only**	
4. Device held the load?	**N= Participation points only**	
5. Device held load but not for required time	**N = Tier 2**	
	MEASUREMENT OF PRIMARY DIMENSION=	

PLEASE NOTE THAT THIS RUBRIC IS A SAMPLE AND GUIDE- IN CASES OF CONFLICT WITH THE RULES, THE RULES TAKE PRECEDENCE OVER THE RUBRIC.

ROCK HOUND

DESCRIPTION: Teams will demonstrate knowledge of types and properties of rocks and minerals as well as natural resources.

COMPETITORS BRING:

- Writing utensil;
- 3-ring binder of any size with any research/reference material. 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.

NUMBER OF PARTICIPANTS: 2 **IMPOUND: NO**

THE COMPETITION:

1. The event may be run as stations, may include a slideshow of images, and/or may be a "pencil and paper" test.

2. Teams will identify as many rocks and minerals as possible from a selected group (may be from images or samples). The list of rocks and minerals will come from the following list:

ROCKS:	basalt	bituminous coal	conglomerate	gneiss
	granite	limestone (fossil)	marble	obsidian
	pumice	quartzite	sandstone	schist (garnet)
	scoria	shale	slate	limestone (chemical)
MINERALS:	calcite	copper	feldspar (pink)	fluorite
	galena	graphite	gypsum-satin-spar	halite
	Hematite	mica-biotite	pyrite	kaolinite
	Quartz (chert)	quartz (crystal)	talc	

3. No more than half of the questions on the exam will be identification questions.

4. Additional questions may be from any of the following topics:
   a. Categories of rocks (igneous, metamorphic, sedimentary)
   b. The rock cycle
   c. Weathering and erosion
   d. Characteristics of minerals (hardness, luster, color, cleavage, streak)
   e. Natural resources (renewable vs. nonrenewable, conservation of resources, Florida resources such as phosphate and limestone)

5. Students may be asked to perform a streak test.

SCORING:

1. **High score wins.**
2. Each question or station will be assigned a predetermined set of points, assigned by the event supervisor and communicated to the teams (preferably- points are identified on the test/station paperwork).
3. Ties will be broken with pre-determined tie-breaker questions which are communicated to teams.

TENNIS BALL CATAPULT

Description: Students will build and calibrate their own free-standing (not handheld) trajectory device that must be capable of "lobbing" a tennis ball at a target placed between 4 and 7 meters away. Students MUST bring and wear impact-resistant safety goggles. **This is a PRE-BUILT EVENT.**

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

The Competition:

1. Each team will bring their own homemade catapult or trebuchet and their own standard unaltered regulation tennis ball(s) to the competition. Please print your team number prominently on the catapult and bal(s)l. If the team fails to bring their own tennis ball(s), they may be supplied by the judge at a penalty of +20 points.

2. Launch force must be provided by gravity or elastic solids (such as springs, rubber bands, bungee cords, etc.).

3. The device may not be more than 50 cm above the ground before, during or after launching. Total weight of the device must be under 50 pounds. Students must be able to move their device from the impound area to the launch site without adult assitance.(If the device violates these design parameters, the team will be placed in Tier 2)

4. 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.

5. The device must sit upon rubber or soft material "feet" to prevent floor damage when moving and launching.

6. 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. A small object will mark the target.

7. The event may take place outside.

8. **The team may not use any digital or electronic devices to aid in aiming or measuring.**

9. Prior to the competition, teams should prepare a design log. The design log will be submitted during impound and should include:
    a. At least 2 diagrams showing different views of the device and details of construction
    b. A graph or data chart compiled from launch practice, graph title, labeled x- and y- axes and using appropriate units for usage of their device.
    c. The log should be clearly labeled with the team number.
    d. Students should be prepared to answer questions about their device and graph.

Impound:

1. During the designated impound period, the team must impound their catapult/trebuchet, any materials needed to alter the device during the testing phase, a tennis ball, impact resistant safety goggles, and their design log. All items should be clearly marked with the team number.
2. During impound, Event Supervisors will evaluate all devices for safety and determine if the device is suitable for testing and meet the design requirements.

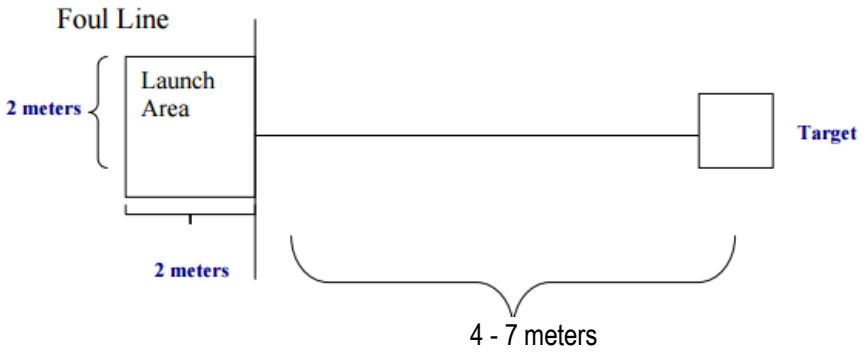
Launching:

1. Once the team is called to set up for launching, no coaching or support from outside is allowed. This could result in the team being placed in TIer 3.

2. Impact-resistant safety goggles (or glasses) are required during launch time. If team members do not wear safety goggles while they are setting up and running their device, they will be given an initial warning and a penalty of +20 points. If a second warning is given, the team will immediately be placed in Tier 2.

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. A violation of this rule will result in the team being placed in Tier 3.

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 is called is 5 minutes. Each team will have a one-shot practice round after which they will shoot at the target two times. The second and third shots will count toward the official score.**

6. **The practice shot measurement will only be used in the case of a tie.**

7. Teams must give ample warning to the supervisors prior to launch. Warning may be "3,2,1 launching…" etc. A penalty of +20 points will be assessed for failure to warn supervisors before each launch.
8.
9. Only successful launches will be measured. Launches are successful when a Tennis Ball's first bounce goes beyond the foul line. Only 2 shots are allowed, beyond the practice shot, regardless if they are successful or not. (An unsuccessful launch will be counted as 2m (200 cm) from the target for the purposes of averaging launches.)

10. 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 or design parameters..

11. 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. **All measurements will be announced in centimeters.**

12. 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 2 meters from the launch area, will also be measured according to the initial point of impact as determined by the supervisor. Tennis balls hitting the target on initial impact will receive a score of zero. Tennis balls with an initial impact beyond 2 meters will be scored as 2 meters.

13. No tennis balls should be shot before or during the catapult event except during the 5-minute specified practice round or actual competition.

14. Teams will be allowed to use their graph or any information from the design log during competition.

15. The event supervisor will make every attempt to advise students of any penalties incurred during the launch.

Scoring:

1. ***Low*** **score wins.**
2. Score is the average of the distance from the target in centimeters, measured to a single centimeter precision. 1 centimeter is 1 point
3. Devices which do not meet the design requirements will result in the team being placed in Tier 2.
4. Penalties may be assessed as listed in the rules.
5. Ties will be broken by the distance from the target on the third tiebreaker launch.

Tennis Ball Catapult Scoring Rubric

Team #: _____ **School/Team Name:** _____

IMPOUND :		Does the Catapult meet the requirements? (Y/N)
Catapult determined to be safe?	**N= Cannot compete;**	
Catapult sits upon rubber or soft material so as to not damage floor? **Cannot compete**	**N =**	
Catapult is within design parameters. Less than 50 cm tall and less than 50 ponds	**N = Tier 2**	
Catapult labeled with team #?	**N= -Tier 2**	
Tennis ball(s) impounded and labeled	**N= Tier 2**	
Design Log provided?	**N = Tier 2**	
Impound on time?	**N = Tier 2**	
	TIER?	

LAUNCH SCORE :	Points
Practice Launch - will be measured and announced to team and used only for breaking ties. (enter below)	
Launch #1 distance from target_____cm failed launch = 200 cm	
Launch #2 distance from target_____cm failed launch = 200 cm	
Average of the two Launches=	

LAUNCH PENALTIES :

	Penalty
Failure to announce launch (3,2,1 …launching) **+ 20 points**	
Student or device crosses launch line? **+20 points**	
Tennis Ball supplied by Event Supervisor **+20 points**	
Goggles violation **+20 points or Tier 2**	
Outside interference? **Y= Tier 3**	
TOTAL=	

PLEASE NOTE THAT THIS RUBRIC IS A SAMPLE AND GUIDE- IN CASES OF CONFLICT WITH THE RULES, THE RULES TAKE PRECEDENCE OVER THE RUBRIC.

WEATHER PERMITTING

DESCRIPTION: .This event will test the team's knowledge of conducting investigations and using appropriate technology to build an understanding of weather.

COMPETITORS BRING:

- Pencil/writing utensil
- 3-ring binder of any size with any research/reference material. 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.

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND:**

NO THE COMPETITION:

1. The event may be run as a sit-down test, station or a combination of the two. Teams will answer questions and/or complete tasks to assess any of the following topics:
    a. Water Cycle, including
        i. Processes of evaporation, condensation, precipitation, and run off
        ii. Types of precipitation
        iii. Location of major sources of water and the water cycle
    b. Clouds, including
        i. Types of clouds - identification from images or descriptions. Cloud types are limited to cirrus, cirrostratus, cirrocumulus, altostratus, stratus, stratocumulus, nimbostratus, cumulus, mammatus, lenticular, fog, and contrails.
        ii. Processes of cloud formation
        iii. Cloud relationships to weather conditions
    c. Identification and description of the function of weather instruments (thermometer, barometer, rain gauge, hygrometer, sling psychrometer, wind vane, anemometer, weather balloon, radar, satellite)
    d. Weather forecasting - using weather data to identify, describe, and/or predict weather conditions. To include:
        i. Description/definitions of weather-related terms (dew point, front, humidity, relative humidity, pressure, air mass, windspeed, etc.)
        ii. Identification of weather station and weather map symbols
        iii. Reading weather maps/weather station data
        iv. Using weather maps/weather station data to describe expected weather conditions
        v. Using weather maps/weather station data over time to predict weather
    e. Preparation for Severe weather and natural disaster
        i. Understand the need for a preparedness plan
        ii. Be aware of common precautions for severe weather; ie lightning, tornado warning, hurricane preparedness, etc.

SCORING:

- **High score wins.**
- Points will be awarded for the accuracy of responses.
- Ties will be broken by the accuracy or quality of preselected questions chosen by the event supervisor.

WRITE IT, DO IT

DESCRIPTION: **Each participant will write a description of an object and how to build it and their partner will attempt to construct the object from this description.**

COMPETITORS BRING:

- **Pencil/writing utensil**

NUMBER OF PARTICIPANTS: Maximum of 2 **IMPOUND: NO**

THE COMPETITION:

1. **The event will take place in two rooms.**
2. **During the first 20 minutes, the participants in each room will be shown an object, which may be abstract, but is the same for all teams. Example materials may be: drinking straws, paper cups, pipe cleaners, string, popsicle sticks, paper, etc.**
    a) **Materials are not limited to this list.**
    b) **The participant is not allowed to touch the object unless permitted by the Event Supervisors.**
2. **The participants have 20 minutes to write a detailed description of the object and how to build it.**
    a) **Drawings and diagrams of the model are not allowed**
    b) **Numerals, words, and single letters that fit within the content of the description are allowed**
    c) **Participants may use abbreviations or punctuation that fit within the context of the description**
3. **The Event Supervisors will then change rooms. Students will receive their partner's instructions and attempt to recreate the original object in 20 minutes**

SCORING:

- **High score wins**
- **Points will be awarded for proper size, color, location, orientation, and/or connection. The scores for both constructed objects will be added together to get the team's score.**
- **Pieces connected beyond an incorrect connection will be counted in the score. No penalty for unused parts.**
- **Students will be ranked Tier 2 if a subsection of the model is drawn.**
- **Drawing a complete picture of the model will result in disqualification.**
- **Ties will be broken by predetermined portions of the "build".**