INFORMATION DOCUMENT

SCIENCE OLYMPIAD AT THE UNIVERSITY OF PENNSYLVANIA

PENN SCIENCE OLYMPIAD INVITATIONAL 2021

Draft Two - 2/10/2021

SOUP

Contents

Letter from Our Executive Board

Dear Coaches,

We are so glad your team is attending the fifth annual Penn Science Olympiad Invitational!

We are hard at work to make sure that this year's tournament is the best and largest one yet. Enclosed you will find details regarding your team number, the tournament schedule and policies, and other important information. This year, we will have 100 teams competing from 15 unique states in our hybrid miniSO tournament.

We are super excited to host you here! Please feel free to reach out to us if you have any questions.

See you in February,
SOUP Executive Board

TEAM LIST

Team #	Team Name	State
1	Abington Heights High School	PA
2	Allentown Central Catholic High School	PA
3	Athens Area High School - A	PA
4	Athens Area High School - B	PA
5	Bayard Rustin High School - A	PA
6	Bayard Rustin High School - B	PA
7	Bridgewater Raritan Regional High School	NJ
8	Brighton High School	NY
9	Brooklyn Technical HS	NY
10	Canton High School	MI
11	Carmel High School - A	IN
12	Carmel High School - B	IN
13	Centennial HS - A	MD
14	Centennial HS - B	MD
15	Chaminade High school	NY
16	Chattahoochee High School - A	GA
17	Chattahoochee High School - B	GA
18	Cherry Hill East High School	NJ
19	Union-Endicott High School	NY
20	Columbia High School	NY
21	Conestoga High School - A	PA
22	Conestoga High School - B	PA
23	Cumberland Valley High School - A	PA
24	Cumberland Valley High School - B	PA
25	Cumberland Valley High School - C	PA
26	East Brunswick High School	NJ
27	Ed W. Clark High School	NV
28	Fairfax High School - A	VA
29	Fairfax High School - B	VA
30	Fayetteville-Manlius Senior High School	NY

TEAM LIST (CONT.)

Team #	Team Name	State
31	Harriton High School - A	PA
32	Harriton High School - B	PA
33	Hillsborough High School - A	NJ
34	Hillsborough High School - B	NJ
35	Hunter College High School - A	NY
36	Hunter College High School - B	NY
37	Iolani School	HI
38	John Jay High School	NY
39	John P. Stevens High School - A	NJ
40	John P. Stevens High School - B	NJ
41	JR Masterman School	PA
42	Kellenberg Memorial High School	NY
43	Lake Braddock High School	VA
44	Lexington High School	MA
45	Liberal Arts and Science Academy - A	TX
46	Liberal Arts and Science Academy - B	TX
47	Longmeadow High School	MA
48	Lower Merion High School - A	PA
49	Lower Merion High School - B	PA
50	Mason High School - A	OH
51	Mason High School - B	OH
52	Mason High School - C	OH
53	Merrimack High School	NH
54	Middlesex County Academy for Science, Mathematics & Engineering Technologies	NJ
55	Mira Loma High School	CA
56	Montgomery High School - A	NJ
57	Montgomery High School - B	NJ
58	North Penn High School - A	PA
59	North Penn High School - B	PA

TEAM LIST (CONT.)

Team #	Team Name	State
61	North Pocono High School - B	PA
62	Parkland High School - A	PA
63	Parkland High School - B	PA
64	Philadelphia High School for Girls	PA
65	Plattsburgh High School	NY
66	Princeton High School	NJ
67	Reservoir HS - A	MD
68	Reservoir HS - B	MD
69	River Hill HS	MD
70	Saint Anthony's High School	NY
71	Saline High School - A	MI
72	Saline High School - B	MI
73	Shady Side Academy - A	PA
74	Shady Side Academy - B	PA
75	Solon High School - A	OH
76	Solon High School - B	OH
77	South Brunswick High School - A	NJ
78	South Brunswick High School - B	NJ
79	Staten Island Technical High School	NY
80	Strath Haven High School	PA
81	Stuyvesant High School - A	NY
82	Stuyvesant High School - B	NY
83	Sylvania Southview High School - A	OH
84	Sylvania Southview High School - B	OH
85	Syosset HS	NY
86	The Hun School of Princeton	NJ
87	The Mount Academy - A	NY
88	The Mount Academy - B	NY
89	The Shipley School	PA
90	Thomas Jefferson HS for Science and Technology	VA

TEAM LIST (CONT.)

Team #	Team Name	State
91	Townsend Harris High School - A	NY
92	Townsend Harris High School - B	NY
93	Upper Dublin High School	PA
94	Ward Melville High School - A	NY
95	Ward Melville High School - B	NY
96	West Windsor Plainsboro HS North - A	NJ
97	West Windsor Plainsboro HS North - B	NJ
98	West Windsor-Plainsboro High School South - A	NJ
99	West Windsor-Plainsboro High School South - B	NJ
100	Westborough High School A	MA

SATURDAY, FEB 27

EVENTS

10:00 AM to 4:00 PM

Students will compete in events based on the schedule on the following page. The numbers in the table represent team numbers.

All events will follow national rules.

PENN PANELS & GAMES

2:30 PM to 5:00 PM

Game Time! (2:30-3:30): Game Session 1

Penn Panels (3:30-5:00): Panels with the Vagelos Integrated Program in Energy Research (VIPER), Management & Technology Program (M&T), and Penn students

SUNDAY, FEB 28

CAMPUS TOURS & GAMES

11:00 AM to 4:00 PM

Campus Tour (TBD): Take a virtual tour of Penn's campus, led by Penn's Kite & Key club.

Game Time! (3:00-3:30): Game Session 2

CLOSING CEREMONY

4:00 PM to 6:30 PM

Join us for this year's closing ceremony, which highlights two speakers. This year's keynote speaker will be Grant Sanderson from the popular educational YouTube channel 3blue1brown. Our guest speaker is Dr. Jayatri Das, Chief Bioscientist at the Franklin Institute.

EVENT SCHEDULE

Event	10:00-10:50	11:00-11:50	12:00-12:50	1:10-2:00	2:10-3:00	3:10-4:00
Anatomy & Physiology	1-16	17-33	34-50	51-66	67-83	84-100
Astronomy	1-16	17-33	34-50	51-66	67-83	84-100
Boomilever *	Video Submission due by 10 AM ET on Saturday, Feb 27					
Chem Lab	67-83	84-100	1-16	17-33	34-50	51-66
Circuit Lab	1-16	17-33	34-50	51-66	67-83	84-100
Codebusters	51-66	67-83	84-100	1-16	17-33	34-50
Designer Genes	67-83	84-100	1-16	17-33	34-50	51-66
Detector Building **	1-16	17-33	34-50	51-66	67-83	84-100
Disease Detectives	51-66	67-83	84-100	1-16	17-33	34-50
Dynamic Planet	67-83	84-100	1-16	17-33	34-50	51-66
Experimental Design	34-50	51-66	67-83	84-100	1-16	17-33
Forensics	84-100	1-16	17-33	34-50	51-66	67-83
Fossils	84-100	1-16	17-33	34-50	51-66	67-83
Geologic Mapping	34-50	51-66	67-83	84-100	1-16	17-33
Gravity Vehicle *	Video Submission due by 10 AM ET on Saturday, Feb 27					
Machines **	17-33	34-50	51-66	67-83	84-100	1-16
Ornithology	51-66	67-83	84-100	1-16	17-33	34-50
Ping Pong Parachute *	Video Submission due by 10 AM ET on Saturday, Feb 27					
Protein Modeling **	17-33	34-50	51-66	67-83	84-100	1-16
Solar Power *	34-50	51-66	67-83	84-100	1-16	17-33
Sounds of Music **	67-83	84-100	1-16	17-33	34-50	51-66
Water Quality **	17-33	34-50	51-66	67-83	84-100	1-16
Wright Stuff *	Video Submission due by 10 AM ET on Saturday, Feb 27					
Write It Do It	84-100	1-16	17-33	34-50	51-66	67-83

*Trial Event | **No Build Component | All times in Eastern Time

TOURNAMENT POLICIES

At SOUP, all our event rules follow National Science Olympiad's competition rules. Our tournament policies, as listed below, also match those of National State Science Olympiad from the website.

In all tournaments, all officials, coaches, team members and spectators are expected to abide by the rules as stated in the Official Rules Manual. Violations may include any of the following:

01 INTERFERENCE

Only the team members assigned to the event may enter the competition area along with those supervising and judging the event. All others are to remain out of the room or the competition area at all times. If any student, coach, teacher, chaperone or parent interferes with or disrupts the conduct of the event, the team associated with the person will be penalized at the discretion of the event supervisor in conjunction with the appeals board. The team, coach and the site director will we notified of this action.

02 CHEATING

Any individual who cheats during an event will be penalized by disqualification. The team and the coach will be apprised of this action. If an event team or team member deliberately takes an action that impairs the ability of another team to fairly compete, that team will be disqualified from that event. Depending on the severity of the action taken by the team members, further action by the appeals board may result that the team members are disqualified from other events. Upon reporting this action to the State Board, the team members may be barred from further tournaments.

03 VANDALISM

If a member of a team or a person associated with a team commits an act of vandalism, the team will be disqualified from the tournament. Vandalism means deliberate action that results in damage to property. This includes, but is not limited to, graffiti, damage to facility property, and damage to personal property of competitors, judges and supervisors.

COACH INSTRUCTIONS

We will be using Scilympiad for all events. To use Scilympiad as a coach, please see the following tips. Please see the following pages for Scilympiad tutorials.

Team Logistics

The team coach is responsible for collecting all the necessary forms from participants and sending them to us in a timely manner. Science Olympiad at the University of Penn (SOUP) has its own team registration form, media release form, and waiver of liability agreement. In addition, we require all of the Pennsylvania Science Olympiad (PASO) forms: the coach form, parent form, and build event form. All of these forms will be emailed in January.

At the end of the tournament, the team coach is responsible for verifying team scores and placements. Following the closing ceremony, we will be shipping out medals, plaques, and trophies. Awards include coach plaques for the top 3 teams, team trophies for top 6 teams, medals for the top 8 teams for non-trial/not optional events, and medals for the top 6 teams for trial/optional events. These awards will be shipped to the team coach's address that is on-file on Scilympiad. Please send us an email if you would like to change your preferred shipping address.

We will be hosting Q&A sessions for coaches in mid-January to early February.

Allowed Materials

Coaches should ensure that participants are aware of the rules set by the National Science Olympiad. Per the COVID rules modifications, each individual participant may have a personal set of reference materials (e.g., binders, single sheets of paper), calculator, or other academic resource(s) as specified in the specific event rules for use during the competition to allow social distancing and to prevent resource sharing. For example, if the event says "Each team may bring 1 sheet of paper," the COVID rules modifications allow each participant to have a sheet of paper as their resource and the contents on the two partners' note sheets can be identical or can be different. If the event says "Each participant may bring 1 sheet of paper," each participant can still bring only 1 sheet of paper.

Video Calls

In the unlikely event that we will need to set up a private video call for an event, the Event Supervisor will set up the video call and distribute the link ahead of time. The Event Supervisor will also allow participants ten minutes to move between events. Setup and preliminary checks will occur in the main Zoom room. Participants will then move to breakout rooms with the Event Supervisor to complete anything necessary for the event. During these calls, participants will not allowed to be together to be equitable to all teams.

PARTICIPANT INSTRUCTIONS

We will be using Scilympiad for all events. To use Scilympiad as a participant, please see the following tips. Please see the following pages for Scilympiad tutorials.

Scilympiad Instructions

Scilympiad allows partners to see our tests at the same time. To ensure your answer will save properly, please use Edge or Chrome as your browser on your desktop or laptop.

Prior to tournament day, participants should create an account using the login ID provided by their coach. To do that, go to the tournament web page and click on "Tournament", then "Student Dashboard." Afterwards, click on "Take online test using Login ID." The first time a participant logs in, the system will ask to create a password. Once logged in, participants should see a list of the events they will be taking. If they cannot see all of the events or if they see extra events, they should let their coach know as soon as possible.

Once participants are on the event page, they will see the key parameters for their test. Participants will also see a chat box for them to communicate with their partner or the Event Supervisor(s). They should check with either partner first to make sure they're both ready to start the test before clicking "Start." As soon as either partner starts the test, the timer will start. When one partner clicks on an answer, the answer will show up on their partner's test immediately. For free responses, the system will save the answer automatically each time a participant clicks outside of the textbox. Please save answers periodically by clicking outside of the textbox. Also, make sure only one person works on a free response question at a time. If person A writes something for a particular question, and person B is also concurrently working on the question, when person A leaves the question, it will override the contents of person B's work. Please be sure partners work on different free response questions at any time. The only exception is for Codebusters' cryptography questions which requires participants to click "Save Answer."

In Scilympiad, the browser keeps track of the duration that the participant leaves the browser or goes to a different tab. To make sure the timer isn't triggered, make sure the team is set up before starting the test (video calls, etc. connected) and that all desktop notifications are turned off. During a test, participants will see the amount of time they have left for the event. When participants are finished, they should click "Submit." If participants are not done by the end of the period, the system will automatically submit the answered questions when time expires.

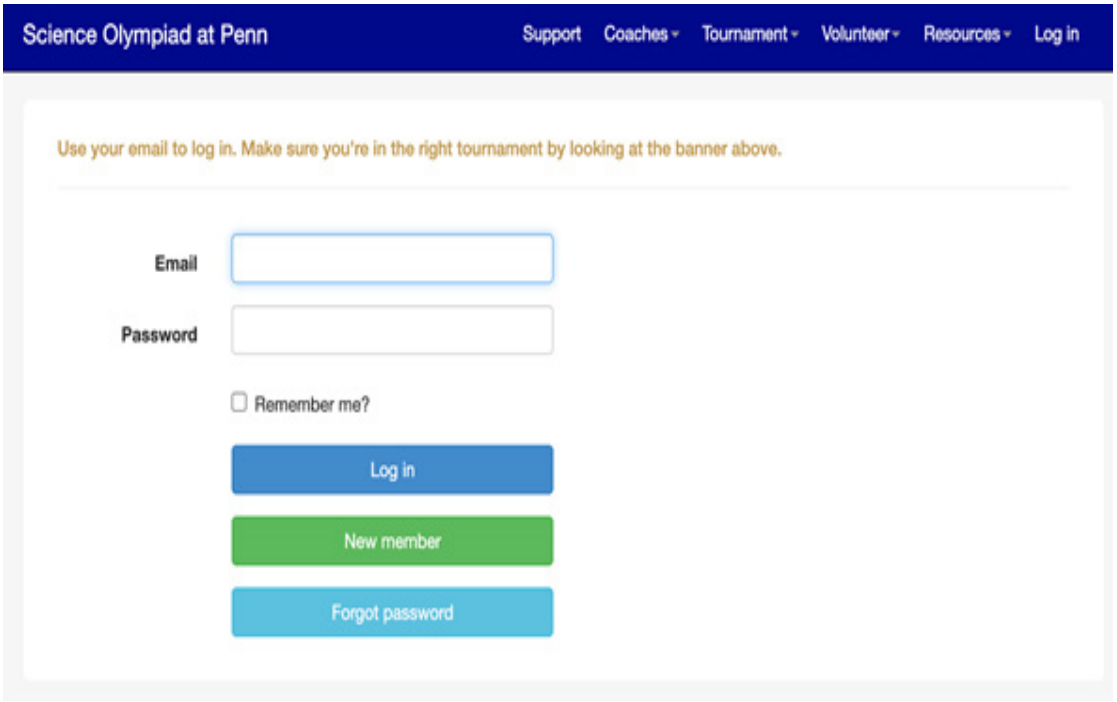
If you need more help with Scilympiad, please visit the Support tab in scilympiad.com/soup. We have posted additional resources under the webinar icon.

SCILYMPIAD TUTORIAL FOR STUDENTS

Creating Student Scilympiad Accounts

Note: If your coach has already registered you with your email, please use the same email when you create your account. Or use the email link.

To create an account, open scilympiad.com/soup and click on the Log In tab in the top right. Then, click on the green button "New Member" and fill in the required information.

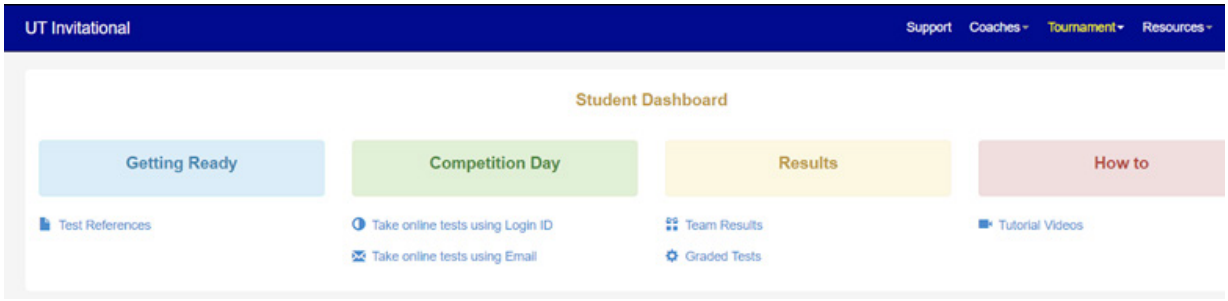


You will need to do this prior to the tournament date so your coach can make the necessary assignments for events.

SCILYMPIAD TUTORIAL FOR STUDENTS (CONT.)

Day of Tournament, Logging in

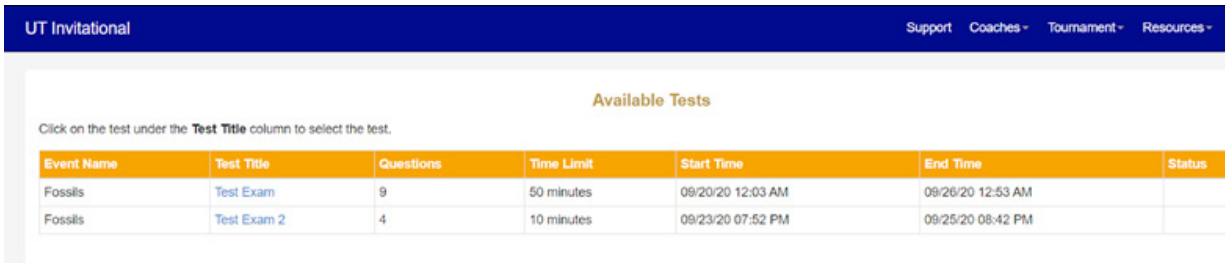
After opening the Scilympiad webpage, look for the Tournament tab in the top right. Hover over it and click on Student Dashboard, which should take you to the screen shown below.



(Image courtesy of UT Austin SO Invitational)

From here, you have access to many resources, including test references, team results (once released), and the testing environment. Under Competition Day, you must log in with "Take online tests using Login ID". Your coach should have access to each student's unique ID, so make sure to ask him/her for it.

Below is an example of what your screen should look like once you have logged in. When ready, click on an exam to begin.



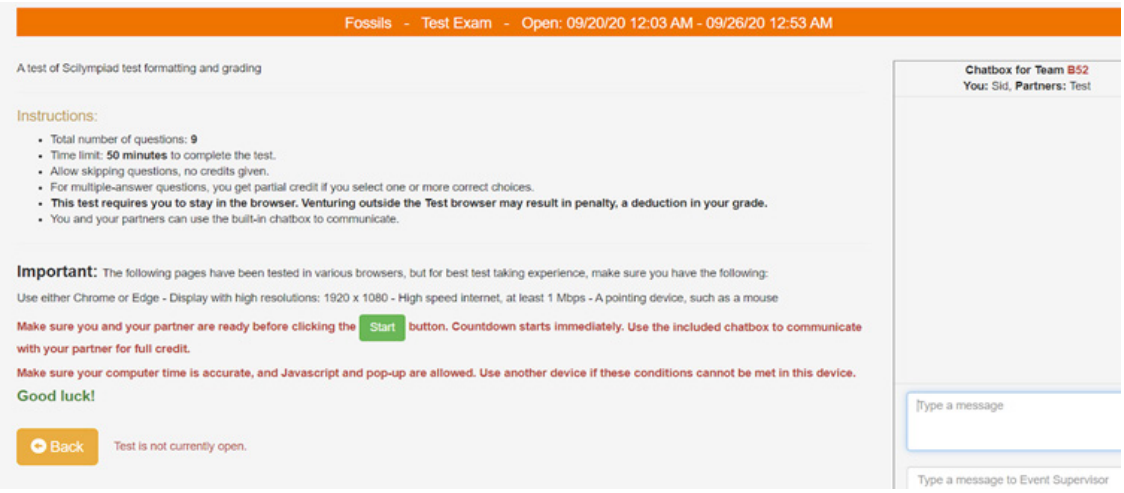
(Image courtesy of UT Austin SO Invitational)

You must start the test within the time slot indicated on the schedule. After the block, the test will be closed and you will no longer have access. Please start the test promptly within the timeblock to ensure the full 50 minutes.

SCILYMPIAD TUTORIAL FOR STUDENTS (CONT.)

Day of Tournament, Test Taking

When you click on an exam on the Available Tests page, it will take you to the Test Introduction. This page will have general information about the exam and instructions provided by the event supervisor. When you and your partner are ready to begin the exam, click the Start button. Once the countdown timer begins it cannot be paused for any reason.



(Image courtesy of UT Austin SO Invitational)

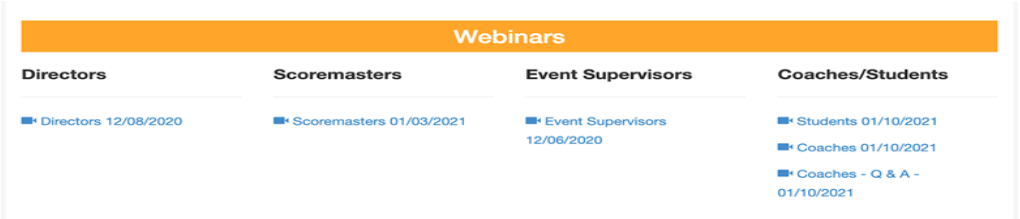
Some exams may have a supporting document to the exam which will be downloadable at the top of the test after clicking the Start button. While taking the exam, answers you input will be saved automatically after you select or type them. When you are finished with the exam, click Finish Test at the bottom of the page. If this button is not visible to you, try scrolling outside of the questions area in the lower half of the window.

If you are working with a partner, there is a Sync Answers button at the bottom next to Finish Test which updates your test version with answers your partner has inputted.

If you have any questions during the exam (whether content or technological), you can use the chat box on the right side of your screen to directly chat with an event supervisor. If they are not responsive and it's an urgent question, please send us a message via Remind101.

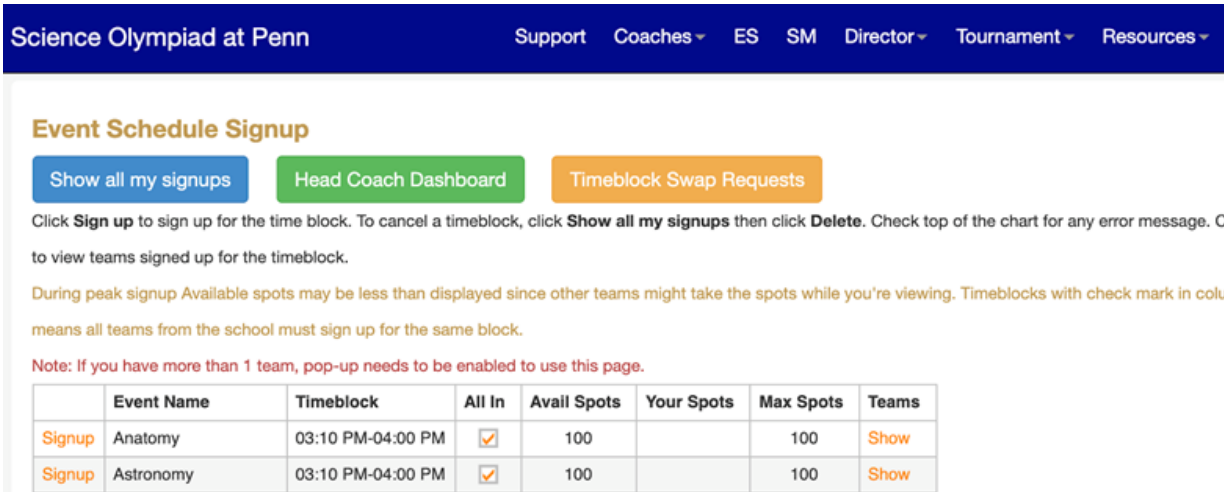
Video Tutorials

Before the tournament, feel free to access the webinars for video tutorials of the website. Go to the Support button on the top blue bar, under Resources, click Webinars, and click Students 01/10/2021.



Under Sign Up

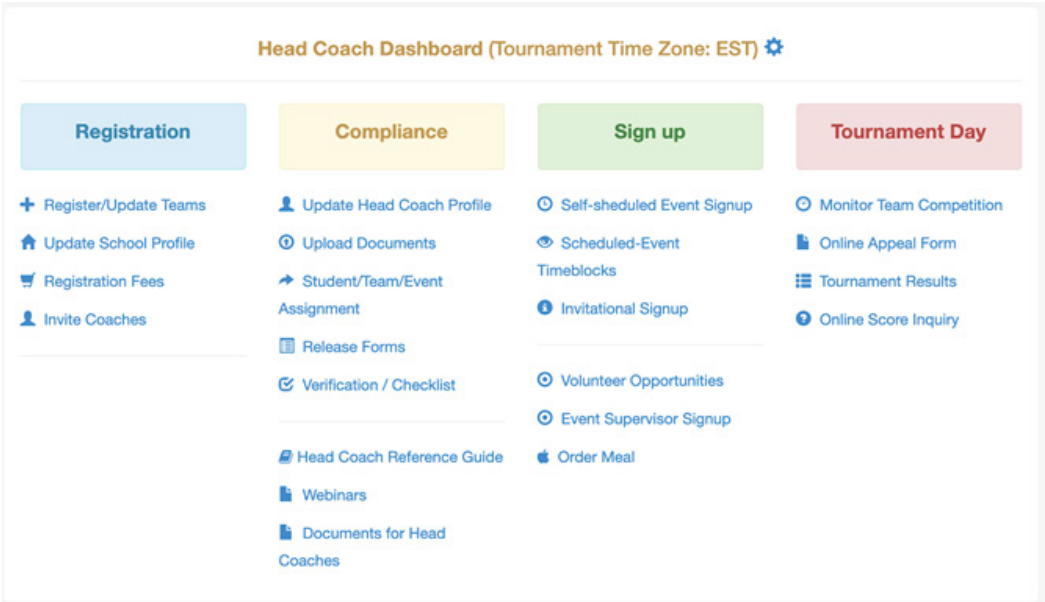
Under Scheduled-Event Timeblocks, here you can view your team's event schedule. There should only be one time block for each event. Click Event Signup. Click Signup next to all events you plan on participating in. (Note: Build events and Solar Power will not be on this list. We will send out a separate Google Form)



(Image courtesy of UT Austin SO Invitational)

Under Compliance

- ❑ Make sure Head Coach Profile is updated
- ❑ Make sure your teams are registered
- ❑ Submit the 2 required Release Forms for each student
- ❑ Ensure completion of 3 PASO (linked) release forms

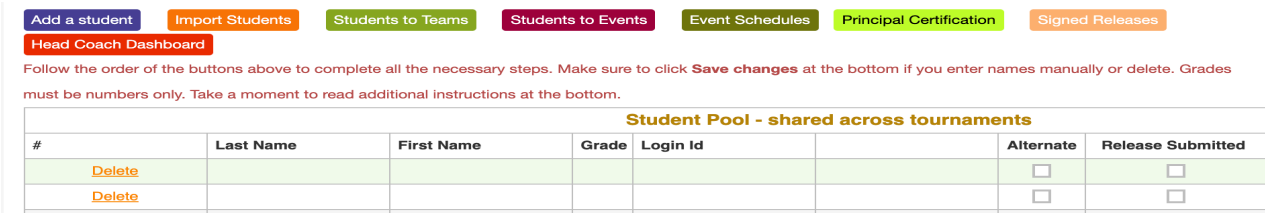


(Image courtesy of UT Austin SO Invitational)

SCILYMPIAD TUTORIAL FOR COACHES (CONT.)

Assigning Students to the Roster and Putting Them into Teams

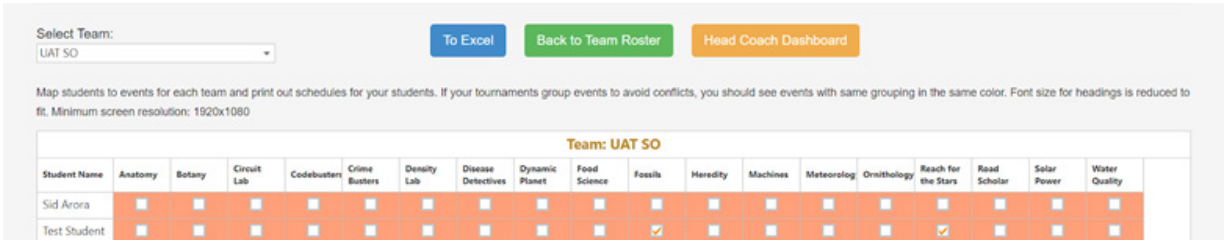
- ❑ Click on Student/Team/Event Assignment
- ❑ If you already inputted the number of members for your team, a row for each student should already be there to be filled out. From there you can select each box and fill out the names and grade of each student. You can state whether they are an alternate, they completed registration, and if they submitted their release documents. Login IDs are automatically generated.
- ❑ If there are no rows allotted, you can simply add a student or you can import students from an existing Excel file. You can also delete a student by selecting delete on their row.
- ❑ You can preview changes by selecting the respective button on the bottom. You can then save changes to confirm the changes. You can also cancel changes.
- ❑ To assign each student to their specific team, click students to teams and add/remove each student there. It is best to input all of your students first on the initial page before doing this. You can add students by clicking the checkbox next to their name and then selecting add to the proper name. Likewise, you can remove students to put them back into the pool to be inputted into another team.
- ❑ Once you have done that, you can now assign students to their events by clicking Students to Events.

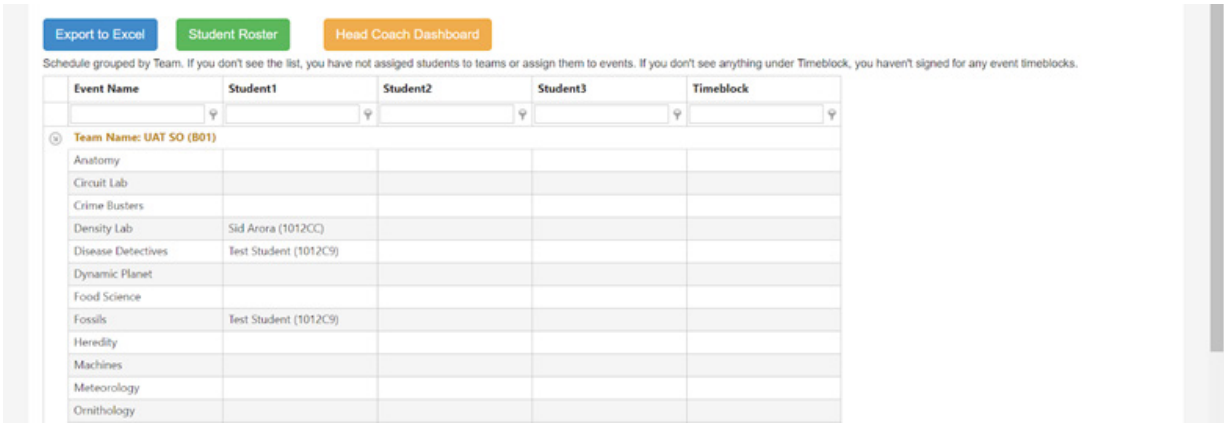


SCILYMPIAD TUTORIAL FOR COACHES (CONT.)

Assigning Events to Students

- ❑ You can change which team you are assigning events into with the Select Team dropbox.
- ❑ To assign students to events, simply click the checkbox of the event the student wants to compete in their respective rows. Events with the same color are in the same time slot.
- ❑ Once you are done assigning events, you can preview changes and then save changes to confirm the selection. You can also cancel changes to assign the events at another time.
- ❑ You can view the event schedule by selecting Event Schedules from the team roster page. You can find the listed events and the students competing in each event.



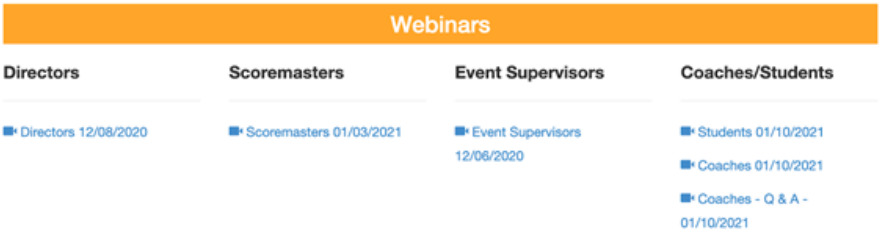


(Image courtesy of UT Austin SO Invitational)

SCILYMPIAD TUTORIAL FOR COACHES (CONT.)

Video Tutorials

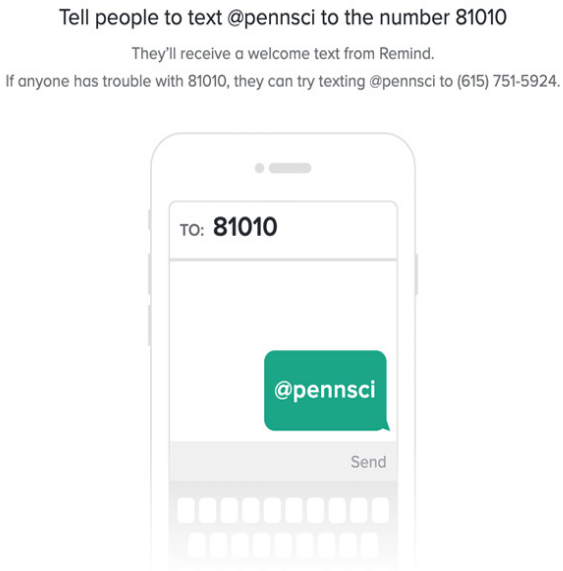
Before the tournament, feel free to access the webinars for video tutorials of the website. Go to the Support button on the top blue bar, under Resources, click Webinars, and click the coaches videos.



Communication with SOUP During Tournament

We will be using Remind101 for all communication during the span of the tournament. All tournament-wide announcements will go out on this platform. You can choose to get alerts through email or phone.

- ❑ Sign up for Remind101 via Computer:
  Go to the following link: remind.com/join/pennsci
  Complete the prompted information
- ❑ Sign up for Remind101 via Texts:



We recommend downloading the app or using your computer to access Remind101. During the day of the tournament, you will have the ability to send us direct messages so we can address any questions/problems/website difficulties. Please also have your students sign up for Remind101 on their devices also to receive the most up to date information. We highly encourage you to keep this line of communication open with us!

CHEMISTRY & PHYSICAL SCIENCE EVENTS

Chemistry Lab	For this year's Chemistry Lab event, there will be a mix of conceptual and calculation-based questions. Since the tournament will be online, students will not have to expect any hands-on lab activities. However, students may be asked to write the procedure, conclusion, or error analysis for a hypothetical experiment. Topics will involve pH calculations, mass percentage, error analysis, solubility, back titration, precipitation, titration curves, etc. Students should expect to use their scientific calculator for several questions. Students should also come prepared to scan and upload their test in the event that we do ask for work shown on certain problems. We recommend phone applications like Adobe Scan or CamScanner.
Forensics	This year's event will be similar in format to that of previous years, with a crime scene that requires careful analysis of key pieces of evidence in order to identify the perpetrator. However, there will be a few changes in order to help adjust to the online testing platform. Rather than having students perform the experimental section by hand, we will be utilizing a combination of videos, images, and diagrams generated by our own event supervisors. Additionally, students should come prepared with a greater understanding of the underlying principles and concepts behind the techniques (e.g., PCR, blood typing, etc.) because they may find a question or two about those as well.
Protein Modeling	In this event, students will be tested on their knowledge of the chemistry of protein folding, the biology behind protein expression, the scientific techniques used to research proteins, and the CRISPR-Cas9 system and subsequent modifications of this bacterial immune system to transform it into a versatile gene editing tool. Questions will be organized into two major sections: a general exam on the topics above, and a more theoretical section where students will use their understanding to analyze proteins in Jmol and interpret protein research. The proteins used in this theoretical section will be selected from well-studied proteins that are representative of major protein classes and/or relevant to the COVID-19 pandemic.
Machines	In order to adapt to the online test setting, this event will be focused on the written portion, along with a few conceptual and practical questions about the build portion of the event. Topics to be tested include energy, forces, torque, friction, rotational motion, and equilibrium, as well as how they apply to both simple and compound machines. Additionally, there may be questions in the build section regarding data interpretation and problem solving for hypothetical machines. Students can expect a variety of multiple choice and short answer questions on this year's test that assess the given topics at a range of difficulties.

BIOLOGY EVENTS

Anatomy & Physiology	This year's exam will feature a longer test with many more questions.
Designer Genes	This year's exam will have a format that is similar to last year's exam. There will be lots of questions that relate to one another, and the questions will be more case-based than fact-based so that they will be difficult to look up. The event supervisors will stick to multiple-choice mostly to keep things simple in terms of grading, and they are planning to cover all the topics in the rules manual with at least 1 question. Tiebreakers will be integrated into the exam.
Disease Detectives	For this year's exam, the event supervisors want to keep the format largely the same as usual. The exam will have two large case studies composed of mostly short answer or extended response questions, along with a third section that tests general Disease Detectives knowledge, interspersed with smaller case studies of its own.
Ornithology	This year's exam will involve an extended test with more bird call sound files, conceptual questions, "reverse" questions (given the trait, name the bird), hypotheticals, and conservation questions.
Water Quality	This year's exam will be 100-150 questions with more short answers/free response ecology/reef questions to test depth of understanding. For the ID parts, there will be lots of species-specific questions and possibly case studies requiring some depth of understanding. The salinometer testing portion will not be included for this year.

ORINTHOLOGY BINDER POLICY

All parameters outlined in the 2021 Division C Ornithology Rules apply unless otherwise detailed in this binder policy.

2. **EVENT PARAMETERS:**
   a. Each team may bring one 2" or smaller three-ring binder, as measured by the interior diameter of the rings, containing information in any form and from any source along with one commercially produced field guide not contained in the binder. Sheet protectors, lamination, tabs and labels are permitted in both the binder and field guide.
   b. If the event features a rotation through a series of stations where the participants interact with samples, specimens or displays; no material may be removed from the binder throughout the event.
   c. In addition to a binder, each team may bring one unmodified and unannotated copy of either the **2021** National Bird List or a **2021** Official State Bird List which does not have to be secured in the binder.

Digital Binder Rules

- All digital binder materials must be prepared BEFORE the time of competition. You may not access any webpages outside of your binder during the competition as a part of your "digital binder."
- Digital binder pages may not exceed 700 pages (comparable to 350 double-sided pages that would fit in a 2-inch binder.)

Physical Binder Rules

- If competitors are not in the same location, they may use 2 copies of the physical binder.
- It is also acceptable if one competitor chooses to use a physical binder and the other competitor uses a digital binder, as long as the two binders contain the same information, despite their difference in format.
- All other rules associated with physical binders outlined in the 2021 Ornithology Rules apply (i.e. 2" or smaller three-ring binder.)

Note on Field Guides

- Per the Div. C Ornithology Rules, the "commercially produced field guide" cannot be contained in the binder.
- The field guide must be a physical book or a downloaded digital copy. You may not access any webpages during the competition as a part of your "digital field guide."
- If competitors are not in the same location, they may use 2 copies of the SAME field guide if they choose.

EARTH & SPACE SCIENCE EVENTS

Astronomy*	This year's exam will have a format similar to last year's exam, with more multiple choice questions and fewer calculation based problems (no calculus involved).
Dynamic Planet*	This year's exam will have a format similar to last year's exam, with more multiple choice and short answer questions. There will be 1-2 long paragraph responses.
Fossils	Fossil images will be uploaded onto the Scilympiad testing site, accompanied by short-answer and multiple-choice questions. The test will be longer than the usual offline format because of a lack of stations.
GeoLogical Mapping	Many problems will require written responses to diagrams and given maps (the event supervisors will check if students can upload pictures of maps). If this does not work, the exam will have short answer and multiple choice questions.
Solar Power	This event will be a trial event. There is no build portion. The test will be predominantly short-answer and multiple-choice questions.

* Rules subject to further modification

NATURE OF SCIENCE EVENTS

Circuit Lab	To adapt to the online format, this event will be focused on the written exam portion, with no hands-on circuit section. The written section will be longer, and it will cover the topics in the rules manual with a stronger focus on conceptual questions and a few more circuit analysis questions.
Codebusters*	This year's test will be similar in format to that of previous years. The timed question will be automatically checked and recorded using Scilympiad's built in system. Time spent off the test tab will be penalized, so teams should print out the reference sheet beforehand for their own use.
Write It, Do It*	We will be running this event as Write It, CAD It according to these rules. The writer will gain access to screenshots of the model when the event begins, and they will have 25 minutes to write their description. This description will be passed to the builder (CADer), who will gain access to a CAD file along with the description when the event begins. The tournament will use the TinkerCAD program. The builder/CADer must have an account made before the tournament.
Experimental Design	This year's event will not have a wet lab portion. Teams will be given a list of materials and equipment to use, and they will design an experiment using those materials and write up a partial report (sections A-F, M, and O of the Experimental Design Checklist). In the second portion of the test, teams must solve a written portion based on statistics. They will be asked questions about the statistics of data, with more focus on conceptual questions over calculations. Topics will include statistics of central tendency, variation, linear regression, chi-square tests, and testing of null hypotheses.
Ping-Pong Parachute	This event will be a trial event. Participants will send in one single-take video of their test run with all parameters shown in the video.

* Rules subject to further modification

BUILD EVENTS

Boomilever*	This event will be a trial event. Participants will send in one single-take video of their test run with all parameters shown in the video.
Detector Building	This event has been changed to a fully written format. The length of the test will be adjusted accordingly to be a full-length written exam. This event will count toward the overall team score.
Gravity Vehicle*	This event will be a trial event. Participants will send in one single-take video of their test run with all parameters shown in the video.
Wright Stuff*	This event will be a trial event. Participants will send in one single-take video of their test run with all parameters shown in the video.
Sound of Music	This event has been changed to a fully written format. The length of the test will be adjusted accordingly to be a full-length written exam. This event will count toward the overall team score.

* Your safety is our first priority. For these building events, please submit a video of your team running the device. All video submissions must be filmed at school under the team coach's supervision in order to qualify. Please title the video with the event name, your team number, and where the video was filmed. Refer to the "Build Events: Rules and Regulations Addendum" section of this document for more information.

Please follow all safety procedures and social distancing guidelines. These events will not count toward the overall team score, but will qualify for trial event awards. Please frequently check this page for additional specifications.

If local guidelines restrict your team's ability to film the device at school, please follow the local guidelines and do not attempt the build event. Teams that are found to be violating safety regulations, including filming at home, will be subject to disqualification.

DEVICE TESTING POLICY

DEVICE TESTING POLICY FOR ALL TOURNAMENTS APPROVED BY PASO in 2020 and 2021

The testing of devices for Boomilever, Gravity Vehicle, Ping Pong Parachute, and Wright Stuff for any invitational tournament approved by PASO must occur in the school of the participating team and supervised by a coach, even if the school is not located in Pennsylvania. The same requirement applies to PASO regional and state tournaments. The purpose of this requirement is two-fold. First, we are concerned that all safety policies, event rules, and PASO testing procedures (as specified by the PASO State Event Supervisor for an event) are followed, and we believe the best person to insure this is done is a coach. Therefore, goggles must be worn as required by the rules for all device testing. Second, all Covid protocols required by the school must be followed as well. Masks must be worn by all persons during device testing and social distancing must be practiced. If any video submitted for grading for these events shows violations of safety policies, event rules, testing procedures, or Covid protocols, the team may be disqualified from the event or penalty applied to the team score for the event.

We realize that some teams may not have access to the school at the time of a tournament and may not be able to test devices as required by this policy (which means they may not participate in these events). That is why these events have been classified as trial events and do not affect team scores.

Testing of the devices for these events during the construction phase may be done at student homes, provided the PASO Parent Acknowledgement is on file with the head coach. However, PASO will not allow testing of devices for these events to be conducted at student homes for tournaments. If an invitational tournament includes other events not listed above that include any device testing, the testing of those devices for the tournament must be conducted in the school and not at a student home.

Since testing of devices must occur in the school, all tournaments approved by PASO are considered mini/satellite hybrid tournaments. Therefore, each team must submit the Satellite SO form (PASO version) if they plan to participate in events that include device testing. If an administrator will not sign the Satellite SO form, the team may not participate in any event in which device testing is required.

Effective 12/1/2020

For the Penn Science Olympiad Invitational, the following events will be counted as trial events. They will count toward individual awards, but will not count toward the team's total score: Boomilever, Gravity Vehicle, Wright Stuff, Ping Pong Parachute, and Solar Power.

BUILD EVENTS: RULES AND REGULATIONS ADDENDUM

The Penn Science Olympiad Invitational 2021 will adhere to the National Division C rules. The contents of the following pages detail submission requirements and other policies relating to events that will have build components, namely Boomilever, Gravity Vehicle, Ping Pong Parachute, and Wright Stuff.

All questions pertaining to these policies should be emailed to pennscienceolympiad@gmail.com With the following email subject line:

Subject: "Builds Clarification - [Event Name] - [School Name]"
(e.g., "Builds Clarification - Gravity Vehicle - Phoenix High School")

General Video and File Submission Guidelines

Any activity related to the device construction/testing and video recording must be conducted under the local, state, and national regulations surrounding COVID-19.

All videos must be submitted between Monday, February 22 at 9:00 AM EST and Saturday, February 26 at 12:00 PM EST. There will be no late submissions accepted for any event under any circumstances.

An email will be sent to coaches before the start of the submission period containing four distinct Google Forms links for each of the four build events listed below. Note that the form will not be accepting submissions until the opening of the submission period. The Google Forms submission links will be used for submission of all of the following events:

- Boomilever
- Gravity Vehicle
- Ping Pong Parachute
- Wright Stuff

General Video and File Submission Guidelines (Cont.)

The video submission must be submitted by the head coach of each team. The form will ask for the following information, at minimum:

- School Name
- Coach Name
- Coach's Contact Information (Phone Number and Email Address)
- Student Participant Names
- Video Submission (described below)
- Filename format: C[Team Number]-[School Name]-[Event]-[Document Description]
  Examples:
  "C014-University of Pennsylvania-Ping Pong Parachute-Flight Log"
  "C200-University of Pennsylvania-Gravity Vehicle-Video Submission"
- Electronic Signature (relating to the Code of Ethics)

Video submission can be done in any of the following ways:

- Video file in a reasonably common file format (i.e., .MP4, .MPEG-4, .MOV, .AVI)
- YouTube link (can be unlisted as long as the video itself is accessible through the provided link and does not require any additional permissions).
- Note that these videos will not be shared with anyone outside of the SOUP organization.
- Event supervisors will be checking upload dates and times of all videos. Any videos that are submitted are subject to immediate judging. Any links/videos edited after the end of the submission period are automatically disqualified.
- Teams are responsible for ensuring that their video upload is accessible. Any questions pertaining to video submission must be submitted via email to pennscienceolympiad@gmail.com before 9:00 AM EST on Thursday, February 24.

BOOMILEVER

Due to the magnitude of build parameters outlined in the rules, event supervisors will not check parameters that they deem to have minimal impact. Furthermore, some rules will be simplified to make it easier for students to create a testing set up. With that in mind, no SOUP policies listed below will be more strict than the official rules. The official rules provide more details that may be relevant to teams in improving the testing setup, but these will not be scored/checked. For all numerical measurements, students should display it to the camera as best as possible and read it out loud in case numbers/markings can not be read in video. The following policies can be split into two main types:

- **Eyeball**: Does not require students to demonstrate measurement in video, but event supervisors will visually determine if these parameters abide by the rules to a reasonable extent.
- **Measure**: Measurement must be explicitly and clearly shown in the video. Students must use standard measurement tools (no custom measurement devices allowed) and all video clips must be framed in such a way that the event supervisors can verify the measurement.

Testing Apparatus Parameters

- ❑ Students may use sand hoppers or hand load their device.
- ❑ Testing Wall
  - ❑ **Vertical, solid surface large enough to support boom (Eyeball)**
  - ❑ **4" J-bolt with ¼" nominal round stock, ⅝ nominal inside hook diameter with threaded ¼" mounting end (Eyeball)**
  - ❑ **Opening between wall and J-bolt edge is 2.5+/-0.1 cm (Measure)**
  - ❑ **J-bolt secured (Eyeball)**
  - ❑ **Horizontal contact depth line 15cm below center or J-bolt hole (Measure)**
  - ❑ **Vertical lines 4 cm to the left and right of center or J-bolt hole (Measure)**
- ❑ Loading Assembly
  - ❑ ~5 x 5 x 2 cm block with ~8 mm hole in center (Measure block 5 cm side, eyeball others)
  - ❑ ¼" threaded eyebolt with 1" nominal eye outside diameter, 2 ¼" to 4 ½" long, through block with wingnut on top (Eyeball)
  - ❑ Sand or comparable material may be used (steel beads, blasting media, etc.) (Eyeball)
- ❑ Stabilizing Sticks
  - ❑ ~½" diameter, ~18" long dowel with spring-type door stop or comparable flexible material on one end (Eyeball)

Diagrams

Aas outlined above, we will allow a bit more leeway in some of the information shown in the diagrams:

1. Boomilever & Testing Wall Diagram Front View
2. Boomilever & Testing Wall Diagram Side View
3. Loading Block Assembly and Bucket Stabilization Sticks

BOOMILEVER (CONT.)

Boomilever Parameters

- ❑ Single structure made of wood and adhesive with no other materials (Eyeball)
- ❑ Can be attached to J-bolt (Eyeball)
- ❑ Center of loading assembly 40-45 cm from wall (Measure)
- ❑ Does not touch wall below horizontal contact line or between vertical contact lines (Eyeball)

Device Testing Parameters

- ❑ Wear at least B grade eye protection
- ❑ No outside help/communication except giving instructions to a camera person
- ❑ A question on the boomilever will not be asked, students will not have to fulfill this requirement.
- ❑ Before Testing
  - ❑ State their estimated load supported (write large, legible on paper)
  - ❑ Weigh boom (Make sure zeroed and fully on scale)
  - ❑ Measure testing wall horizontal, vertical contact lines, J-bolt opening, and loading block side length (as highlighted in above sections)
  - ❑ Loading block must start assembled
  - ❑ Be sure to have everything prepared, boom may not be attached to the J-bolt yet. Timer starts when students say "START" (you can use a timer if you want, but we can use the video timer). 6 minutes
- ❑ During Testing
  - ❑ Mounting hook can not be adjusted, but the assembly block can.
  - ❑ Complete setup (all the way to bucket hanging)
  - ❑ Pause timer. Students say "STOP"
  - ❑ Verify on video that
    - ❑ Boom exerts force on inside radius of J-bolt (ie. not on flat end) (Eyeball)
    - ❑ Boom touches wall above horizontal contact lines (Eyeball)
    - ❑ Boom touches wall outside of vertical contact lines (Eyeball)
    - ❑ Center of loading assembly 40-45 cm from wall (Measure)
  - ❑ Resume timer. Students say "Start"
  - ❑ If students adjust the boom, be sure to reverify the four above parameters.
  - ❑ Students can start loading sand, boom can not be adjusted once students start loading
  - ❑ Pay attention to these throughout the entire loading session.
    - ❑ Where the boom touches wall does not cross contact lines (Eyeball)
    - ❑ Bucket is hanging freely, not caught on anything (Eyeball)
    - ❑ Only tips of stabilizing sticks touch bucket and it does not support the bucket (ie. not on the lip of bucket where force can be exerted upwards) (Eyeball)
  - ❑ Stop loading when it breaks, we may need to subtract weight if students purposefully load more
- ❑ After Testing
  - ❑ Remove any boom pieces from bucket
  - ❑ Weigh sand and loading assembly (block, chain, hooks, etc.) (Make sure zeroed and fully on scale) (Measure)

GRAVITY VEHICLE

Due to the magnitude of build parameters outlined in the rules, event supervisors will not check parameters that they deem to have minimal impact. Furthermore, some rules will be simplified to make it easier for students to create a testing set up. With that in mind, no SOUP policies listed below will be more strict than the official rules. The official rules provide more details that may be relevant to teams in improving the testing setup, but these will not be scored/checked. For all numerical measurements, students should display it to the camera as best as possible and read it out loud in case numbers/markings can not be read in video. The following policies can be split into two main types:

- **Eyeball**: Does not require students to demonstrate measurement in video, but event supervisors will visually determine if these parameters abide by the rules to a reasonable extent.
- **Measure**: Measurement must be explicitly and clearly shown in the video. Students must use standard measurement tools (no custom measurement devices allowed) and all video clips must be framed in such a way that the event supervisors can verify the measurement.

Track

- ❑ For diagrams, refer to this link.
- ❑ Setup
  - ❑ Track is smooth, level, and on a hard surface (Eyeball)
  - ❑ Start and target points are marked with tape (Eyeball)
  - ❑ Target distance from start point to target point is as announced (Measure)

Practice Logs

- ❑ Submit according to official rule guidelines in Scilympiad as a file
- ❑ Display log in video for graders to verify that it is the same as the one submitted online

Construction Parameters

- ❑ Vehicle mass <2.000 kg (Measure)
- ❑ Dowel rod approximately ¼" round with its bottom <1cm from floor, top >20cm above floor, and approximately perpendicular. No part of vehicle (excluding wheels) may extend >0.5cm beyond dowel rod (Eyeball)
- ❑ Only gravitational potential energy may be used to propel the vehicle (Eyeball)
- ❑ Kinetic energy sources other than gravitational are at lowest state in ready to run position (Eyeball)
- ❑ Vehicle is non-horizontal (Eyeball)
- ❑ Release mechanism included (Eyeball)
- ❑ Vehicle and ramp combined in ready to run position: base <50.0cm x 50.0cm, height <100.0cm (Measure)
- ❑ During run, all parts must move as a whole, no parts may fall off the vehicle/ramp, and only the wheels may contact the ground (Eyeball)

GRAVITY VEHICLE (CONT.)

Competition

- ❑ No outside help/communication except giving instructions to a camera person
- ❑ Design questions will not be asked; students will not have to fulfill this requirement
- ❑ No electronic or electric devices including for sighting/aiming may be used (except calculator).
- ❑ Ramp and vehicle must be placed behind the start line and be able to remain in place untouched.
- ❑ Sighting/aiming devices must not be left on track during run.
- ❑ If sighting/aiming device is left on vehicle, the total mass must not exceed 2.000kg (Measure)
- ❑ No substances may be applied to the vehicle/track.
- ❑ A pencil must be used to start the run. The vehicle/ramp cannot be touched, pushed, or held during the release.

Run Parameters

- ❑ Distance from the measurement point to the target point must be measured to the nearest 0.1cm (Measure)
- ❑ Vehicle cannot be touched before measurement
- ❑ Total runs (3) must occur within 10 minutes

Video Recording

- ❑ Measure track target distance, vehicle mass, and dimensions of vehicle/ramp combined in ready to run position (as highlighted in above sections).
- ❑ After measurements are made, the vehicle must be removed from the ramp. The 10-minute timer begins when students say "START" (you can use a timer if you want, but we can use the video timer), following which teams can set up and start up to 3 runs.
- ❑ Each run must begin with the vehicle and ramp in full view. Following release, the camera must follow the vehicle at all times. At no point can the vehicle completely leave the frame of view; otherwise, the run will be considered as a failed run.
- ❑ An overhead view of the measurement from the measurement point to the target point must be provided.

Resources

- https://www.soinc.org/gravity-vehicle-c
- https://www.soinc.org/sites/default/files/uploaded_files/21GravityVehicleTeamChecklist121820.pdf

PING PONG PARACHUTE

Video Requirements

- ❑ The video must clearly show the following perspectives while rotating around the device in a continuous frame:
  - ❑ The bottle itself including the bottle opening
  - ❑ The bottle's connection to the parachute device
  - ❑ The parachute device and the nose
- ❑ Furthermore, the video must show:
  - ❑ The fins are at least 5 centimeters higher than the level of the bottle opening (using a measuring tape or ruler)
  - ❑ A bottle cap that is able to rotate around the nose cone.
- ❑ If using two rockets, please do the above for both rockets prior to launch.
- ❑ The 5-minute launch period will proceed as instructed in the rules, allowing for two launches during the time allotted.
- ❑ You must avoid cuts in the video to simulate a competition environment and allow for event supervisors to view the entirety of the run.

Day-Of Requirements

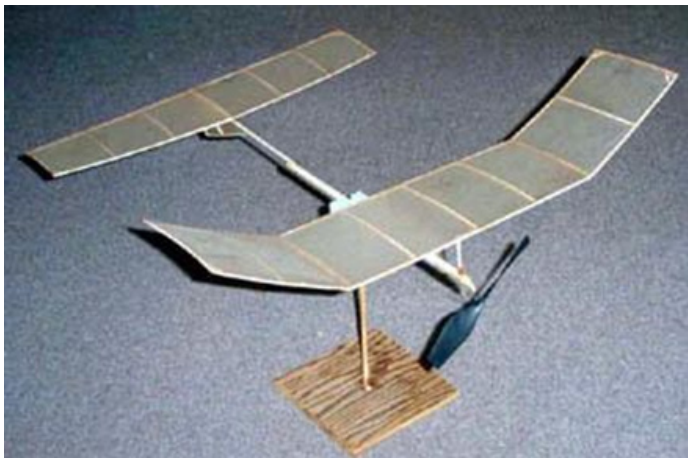
- ❑ There will be a test on Scilympiad that will serve as receipt/confirmation of your video submission.
- ❑ Submit a flight log as a file in Scilympiad, which includes at least 5 parameters for 15 or more test flights prior to the competition. 3 of those parameters must be the following:
  - ❑ Pressure (psi)
  - ❑ Estimated/recorded peak flight height (feet)
  - ❑ Flight time
  - ❑ Note that file type must be a standard/commonly used file type (e.g., .doc, .docx, .pdf, .jpg, .png, etc.). See file naming requirements in "General Video and File Submission Guidelines" section.
- ❑ You will be asked to include an estimate of the height of the launch room on the test. If possible, an exact number would be preferable.
- ❑ The test MUST be completed in order for the team to be eligible for placement in the event.

WRIGHT STUFF

This event will adhere to Division C 2021 rules. This means that event supervisors will be checking all the following parameters are met in your construction and video:

Video Requirements

- ❑ At some point in the submitted video, all of the following must be shown:
  - ❑ Top-down, side, and bottom view of the airplane
  - ❑ Verbal explanation of the materials that were used to construct the plane
    - ❑ All materials except boron filament can be used for this purpose
- ❑ In the same video cut that the plane is flown in, all of the following must be measured:
  - ❑ The weight of the plane. Its mass, excluding the rubber motor, must be at least 8 grams
  - ❑ The dimensions of the wingspan and horizontal stabilizer. The former must not exceed a 30 cm horizontal span, and 8 cm chord; the latter must not exceed a 12 cm horizontal span and 6 cm chord



(Bigger one at front is 30 cm x 8 cm, smaller one at back is 12 cm x 6 cm)

- ❑ The propeller of the plane - its diameter must not exceed 8 cm
- ❑ These measurements may be completed in any way the competitors choose—and can be done before or after the plane is flown—but they must be done in a way that does not put into question the legitimacy of its process. For example, if you wish to use custom measuring devices to show the plane's dimensions, be sure to compare their measurements to those of a standard ruler as well. If the competitors wish to use two planes in their video, they must both go through this process.

WRIGHT STUFF (CONT.)

Flight Period Requirements

- ❑ A competitor must verbally state when they are beginning the Preflight Period. The rubber band cannot be wound when this takes place.
- ❑ After this declaration, only the competitors are allowed to make adjustments to the plane
- ❑ During the Preflight and Flight Periods, the video must be focused on the plane, making it clear to viewers exactly when the plane leaves the competitor's hand, exactly when it first hits the ground, and whether or not it gets stuck while flying
- ❑ Prior to any flight, a competitor must verbally state whether it's a trim or official flight
- ❑ Additional Notes
  - ❑ The competitors must record their flights indoors, as per tournament rules
  - ❑ Competitors do not need to explicitly state any bonuses/penalties their submission should receive, nor calculate their own scores—SOUP members will keep track of this based on the submitted video

Day-Of Requirements

- ❑ Submit a flight log as a file in Scilympiad, which includes at least 6 parameters for 10 or more test flights prior to the competition. 3 of those parameters must be the following:
  - ❑ Motor size before windup
  - ❑ Number of turns on the motor or torque at launch
  - ❑ Flight time
- ❑ All of the measurements in the flight log must be visible to video viewers for graders to verify that it is the same as the one submitted in Scilympiad

CONTACT INFORMATION

If you have any questions or concerns, please do not hesitate to reach out to us.

- Website: http://pennscienceolympiad.org
- Email: pennscienceolympiad@gmail.com
- Scilympiad: scilympiad.com/soup
- Facebook: facebook.com/ScienceOlympiadatPenn/
- Instagram: instagram.com/ScienceOlympiadatPenn/
- Twitter: twitter.com/pennscioly/
- SciOly.org forum: scioly.org/forums/viewtopic.php?f=294&t=18136
- Live-Tournament Updates: pennscienceolympiad.org/updates/

Announcements:

- Updated team list with Union-Endicott High School in place of Cherry Hill East High School - B (Team #19) on pg. 5
- Updated event descriptions for WIDI and Experimental Design
- Added Orinthology Binder Policy section
- Added Scilympiad Tutorials section
- Added Build Events: Rules and Regulations Addendum section
- Activity logistics updated on pg. 9