

## Astronomy Event Supervisor 2019 Transcript

### Slide 1:

This presentation provides state directors and Astronomy event supervisors with information about resources and logistics to consider for designing, developing and running an invitational, regional and/or state Astronomy Event.

### Slide 2:

The Astronomy event is supported by NASA's Universe of Learning STEM Literacy Network via the Chandra X-ray Center and its partnership with the National Science Olympiad.

### Slide 3:

The Webinars posted at <http://Chandra.harvard.edu/edu/Olympiad.html> are overviews of the content and resources to provide teams with a basic understanding of how to prepare for the Astronomy event. A transcript of this webinar is also available on the Chandra website, and the PowerPoint used for the webinar is posted on the National Science Olympiad website at [https://www.soinc.org/astronomy\\_c](https://www.soinc.org/astronomy_c). A separate PPT and transcript for the 2019 competition will also be posted on the NSO website – it was developed for presentations at coaches clinics and is named Astronomy for NSO Coaches Clinics. It gives another perspective to support the Astronomy 2019 webinar presented by Andrea Lin. Andrea is a SO alumni who graduated from UMichigan this year (2018) with a degree in astrophysics.

### Slide 4:

The 2019 Science Olympiad Division C Rules Manual has descriptions for all C events. The event descriptions include the event parameters, including allowable resources and the content necessary for teams to be knowledgeable about for competition. Note that teams can bring binders and/or computers (tablets and iPads are allowable); however no internet is allowed. There will be an exception to the no internet rule for Astronomy that will be discussed later on that will occur for the 2020 competition year, but not for 2019.

### Slide 5:

The content for the Astronomy 2019 competition is stellar evolution in normal and starburst galaxies. The content competition lists the stellar evolution stages, the mathematical laws and relationships, and the Deep Sky Objects (DSOs) that are the basis for the competition. As galaxies require additional knowledge from the previous topics, this content focus will remain the same for 2020 – only the specific DSOs will be different.

### Slide 6:

As an event supervisor for Astronomy you need a copy of the Event Description from the NSO Division C Rules Manual. The page will have 2019 next to the page number at the bottom. This information is available from either the state or tournament director. The manuals can now be downloaded for free on the NSO website. If you have any questions about the Event Description, you can ask questions on the NSO website under the Rules Clarifications menu at [https://www.soinc.org/official\\_rules\\_clarif](https://www.soinc.org/official_rules_clarif). Event supervisors cannot answer individual questions.

#### Slide 7:

This slide provides information as to the type of room that is necessary for this event. As computers are allowed, at least a few outlets should be available in case someone's computer is insufficiently charged to last for the duration of the event. Since the event includes several pages of images, charts and graphs, there should be sufficient table space for computers and binders, as well as the ability to spread out the image pages. At least an hour before competition, the room should be made available so it can be arranged if necessary for teams to work comfortably. Any helpers should be there also so they can be assigned individual tasks – from checking wrist bands to keeping track to the time, passing out or collecting materials, to scoring. The tests should already be placed where you want the teams to sit to not waste the time it takes to pass them out once they are seated. Remember that if there is more than one section for the event each section has to have the exact same amount of time to compete so no section of teams gets the advantage of an extra minute or more of time to work on the test. Do everything you can to ensure that every team has the same set of circumstances.

#### Slide 8:

To develop a good event that addresses the event description takes a serious amount of effort and time; allow yourself 2-3 months to construct the test and have someone else knowledgeable to develop it with you. The event needs to address most of the materials in the event description. Some of the teams will be moving from invitational to regional, state and even national competition. Also consider that the event must be scored in time for the awards ceremony and therefore needs to be easy to correct. If there is more than one possible correct answer they should be listed on the answer key, and any questions with mathematical answers should have an acceptable range of answers on the answer key. Each scorer needs to correct the exact same set of answers for all competing teams, otherwise there will be inconsistency in scoring – what one scorer may give credit for, another scorer may not. Strive for consistency both for time and scoring. At nationals, the scorers sit together and go through the entire test for a final check to ensure the answer key is correct with all possible answers listed. Always bring extra copies of the test.

#### Slide 9:

The event needs to include images, charts and/or graphs as knowledge of the DSOs is essential. The H-R diagram for instance, is key to understanding the process of stellar evolution and should be a major factor in developing questions. Analysis of charts and graphs along with DSO identification is extremely important. A useful resource for this is the Stellar Evolution for Science Olympiad Coaches & Teams webinar posted on the Chandra website. Make sure that you have a numbering system that is not confusing – number questions and image sets differently – at nationals numbers are used for questions and letters for the image sets.

#### Slides 10/11/12:

The Science Olympiad Astronomy alumni write and run several invitationals, as well as some regionals and state tests. Several teams travel to one or more invitationals as practice for regional and/or state competitions. Two invitational Astronomy tests that the team writes are for the MIT and Golden Gate (Berkeley) invitationals. These take place in January (MIT) and February (Golden Gate). For those teams who lack the resources to travel to invitationals, as soon as these events are over, the tests and answer keys are posted on the National Science Olympiad website at <https://www.soinc.org/astronomy-c>. This provides all teams with good practice tests. Some regionals and state tests are also posted here also.

Slide13:

Other resources will be posted on this site, check back periodically to see what has been added. Every year all event tests and answer keys are available from the NSO online store. When the 2019 Test Packet becomes available at <http://store.soinc.org/p-150-test-packets-2019-division-c.aspx> it will include the 2019 Astronomy event test and key. This will be valuable for teams and event supervisors since the topic will remain the same for 2020 except for the DSOs. It will be a good resource to use to construct the 2020 event.

Slides 14:

The Chandra educational classroom ready materials website at <http://chandra.harvard.edu/edu/formal/index.html> includes a complete introduction to stellar evolution as well as several activities and investigations such as card sets, self-guided tutorials, web quests and flash versions of the content.

Slide 15:

A card set has been developed to use as a sequencing activity for teams to learn the stages of stellar evolution. An introduction to the set is located at [http://chandra.harvard.edu/edu/formal/stellar\\_ev/imageset\\_introduction.html](http://chandra.harvard.edu/edu/formal/stellar_ev/imageset_introduction.html) and coaches can request as many sets of the cards that they need for their teams. This would be beneficial for teams that are competing for the first time and have not had the advantage of stellar evolution for the past two competitions that focused on stellar evolution.

Slide 16:

The Ds9 has image analysis software has been transitioned to a new format called Js9 – it is browser based with embedded web pages and will work on a computer. A question set was part of the 2018 competition using screen shots from the js9 website. This format will continue for the 2019 Astronomy event. However, teams will have the ability to access js9 as part of the competition using a dedicated NASA data base/ap for the 2020 competition year.

Slide 17:

Js9 website <https://js9.si.edu/> includes demos on how to acquire images and use the analysis tools. Whether you decide to access the data base or use the screen shots, the more familiar you are with the software the easier it will be for you to answer the js9 related question set that will be part of the 2019 competition.

Slide 18:

This is the JS9 question from the 2018 national test with the answer key. This is a good sample to use to develop a JS9 question for competition. The JS9 website is a beta site and keep checking it for any additional tools that may be added.

Slide 19:

This is a Getting Started with JS9 tutorial written by one of the SO Astronomy alumni. It is also posted on the NSO website and is another helpful tool to learn how to use the JS9 image analysis tools

Slides 20/21:

The old format image analysis tools (DS9) can also be accessed and used also. There is an entire imaging section on the Chandra website that includes investigations that use the DS9 tools. There are DS9 versions and also pencil and paper versions of the investigations. These may also give some ideas as to developing JS9 question sets. The Ultraluminous X-Ray Sources (ULXs) in the Cartwheel Galaxy is especially useful as both the Cartwheel Galaxy and ULXs are part of the content for the 2019 competition. These image analysis investigations are located at <http://chandra.harvard.edu/edu/formal/index.html>

Slide 22:

The investigation on Slide 20 focuses on using the light curve tool to analyze stellar cores. Terry Matilsky, who is helping develop JS9 tools for NSO use, is a professor emeritus at Rutgers and is an X-ray astrophysicist. He has some UTubes videos that are helpful. Also John Kolena wrote some questions and activities using DS9. These resources will also be helpful. Terry Matilsky will be producing a detailed webinar on JS9 to be posted tentatively by January 2020 for the 2020 Astronomy event

Slide 23:

The resources described in this presentation are the only materials necessary for the competition. The Astronomy Manual available in the NSO store is a comprehensive guide to the topics in the Astronomy event. It does not however, have a section on galaxies. This manual is currently being updated and revised. A section on Galaxies and one on Exoplanets will be added.

Slides 24/25:

Follow these suggestions to prepare for competition. Teams that have questions about the event description should access the rules clarification link on the NSO website. This is the place to post questions about clarification issues – the event description and/or resources. Before you post your question check to see if someone has already asked that question and it has been answered. If no one has posted that question yet, then post it and you will be sent an answer. This way if more than one team has the same question, then the answer is already posted when they access the website. Event supervisors are not allowed to answer individual questions. Use the Astronomy Coaches Manuel, the webinar and PowerPoint for content, and the resources listed in the event description for information. The PowerPoint slides have links to sites with useful information.