

## OVERVIEW

Applying leadership and 21<sup>st</sup> century skills, participants collect data, conduct an analysis of the data, and make predictions about the outcomes. Participants document their research and summarize their findings in a digital scientific poster. Semifinalists participate in a twenty-four hour semifinal challenge visually representing a data set provided as an on-site challenge.

## ELIGIBILITY

Three (3) teams of two (2) individuals per state may participate; individual entries are permitted.

## TIME LIMITS

- A. The documentation portfolio of the chapter's entry must be finished, submitted, and accessible via the Internet by 11:59 p.m. ET on a designated date in mid-May.
- B. Preliminary round participant(s) must participate in an on-site presentation of their digital scientific poster, which will last no more than ten (10) minutes, broken down as follows:
  - 1. Two (2) minutes to set-up
  - 2. Six (6) minutes to present
  - 3. Two (2) minutes to remove materials
- C. Semifinalists participate in a two (2) hour on-site challenge submitted online.

## ATTIRE

TSA competition attire is required for this event.

## PROCEDURE

### PRE-CONFERENCE

- A. Participants identify a societal issue and collect or compile data from various sources. The data source must include at least five hundred rows of data.
- B. Participants create their documentation and digital scientific poster according to the regulations.
- C. The documentation portfolio of the chapter's entry must be finished, submitted, and accessible via the Internet by 11:59 p.m. ET on a designated date in mid-May.

- D. The submission information and deadline will be provided in January on the [TSA website](#) under *Competition Updates*.

### PRELIMINARY ROUND

- A. Judges evaluate entries based on the following criteria:
  - 1. Judges review and score the Documentation Portfolio criteria to determine the top twenty-four (24) entries.
- B. The list of twenty-four (24) teams/individuals will be posted on-site on the first full day of conference.
- C. The twenty-four (24) preliminary round contestants report at the time and place stated in the conference program to sign-up for a presentation time.
- D. Participants report at the assigned time and place with a copy of their digital scientific poster to be presented using their own device. The device must be battery powered (e.g., laptop, tablet). No electricity or Internet connection is provided.
- E. Participants are allowed ten (10) minutes to present their digital scientific poster and respond to questions.
- F. A list of twelve (12) semifinalists (in random order) is posted along with instructions for the on-site challenge.

### SEMIFINAL ROUND

- A. Participants have two (2) hours to collaborate on a visual representation of the data set provided on-site, which must be completed on-site within the specified time frame.
- B. Semifinalist teams submit the following as a multi-page PDF on the TSA-provided USB drive:
  - 1. A visual representation
  - 2. A brief synopsis of their entry
- C. Judges evaluate the entries with neither students nor advisors present.
- D. Ten (10) finalists are announced during the conference awards ceremony.

## REGULATIONS AND REQUIREMENTS

Students will work to develop their leadership and 21<sup>st</sup> century skills in the process of preparing for and participating in this TSA competitive event. The development and application of those skills must be evident in their submission, demonstration, and/or communication pertaining to the entry.

### PRE-CONFERENCE

A. Participants must understand the fundamental concepts and principles of the contemporary issue researched. Research about the issue shall focus on:

1. Analysis of the collected data.
2. Representation of that data in various forms.
3. Synthesis of the collected data in terms of factors influencing the issue, societal impacts, and ethical considerations.

B. Documentation Portfolio:

1. The documentation portfolio must be saved as a multi-page PDF document with the pages presented in the following order:
  - a. Title page with the event title, the conference city and state, the year, and the team ID number; one (1) page
  - b. Table of contents; pages as needed
  - c. Introduction and Data Overview; one (1) page
  - d. Data Dictionary; pages as needed
  - e. Purpose- an explanation of the importance of the issue including problems and possible solutions (if applicable); one (1) page
  - f. Methods – the methods used to obtain your data; one (1) page
  - g. Results; pages as needed:
    - i. analysis of the data collected
    - ii. support materials such as graphs and any pertinent data collected
  - h. Conclusions – synthesis of the data collected; pages as needed
  - i. Next Steps – next steps to further analyze the data, collect more data, or minimize the impact of the issue; one (1) page

j. Digital Scientific Poster:

i. Participants must create the digital scientific poster. An editable, downloadable template is available on the [TSA website](#) under *Themes & Problems*. Use of the provided template is optional; one (1) page.

ii. Participants shall incorporate visuals to the digital scientific poster. The scientific poster can have a maximum size of 8.5" x 11".

k. Bibliography/references - A list of references and credible resources in a professional citation style of the competitors choosing. Failure to use a professional citation style will result in a rules violation of 20% (twenty percent). Some examples of professional citation styles include MLA, APA, Chicago, and IEEE; a minimum of three (3) different types of resources must be used; work must be original or cited; pages as needed

l. Appendix - A collection of the raw analysis, to include Excel workbooks, code files, etc.; pages as needed

m. Citation of all ideas, fonts, and images from sources other than the designer, and/or that are copyrighted (most fonts and images found on the web are copyrighted material unless purchased or offered as free-domain). Clip art must be documented.

n. Written permission for all copyrighted material must be included (See Student Copyright Checklist in the Forms Appendix of the [TSA website](#).)

o. If the entry contains images of people, proof of consent must be included as a separate PDF file and submitted with the other required documentation. Images of minors require parental consent (See Photo/Film/Video Consent and Release in the Forms Appendix).

**SEMIFINAL ROUND**

- A. Participants report at the time and place identified in the conference program for the on-site problem.
- B. Participants must have the following computer hardware:
  1. One (1) laptop
  2. Extra charged laptop battery or extra charged laptop as backup
  3. One (1) computer mouse, optional
  4. Converter to allow for a USB input into the laptop, if needed
- C. Semifinalists will receive the on-site problem (data set) on a TSA-provided USB drive
- D. Semifinalists have two (2) hours to create their visual representation and write a brief synopsis of no more than one hundred (100) words, including snapshots of the visual representation.
- E. All work must be completed at the conference during the time specified for the event.
- F. Any entries that are started prior to the conference will result in disqualification.
- G. No electricity or access to Internet will be provided.
- H. Participants save their visualization and supporting documentation as a multi-page PDF document and submit the entry on the TSA-provided USB drive by the designated deadline.

**EVALUATION****PRELIMINARY ROUND****Tier 1**

- A. The documentation portfolio

**Tier 2**

- B. The presentation

**SEMIFINAL ROUND**

- A. The visual representation of the provided data set and synopsis

Refer to the official rating form for more information.

**STEM INTEGRATION**

This event has connections with the STEM (Science, Technology, Engineering, and Mathematics) educational standards.

**LEADERSHIP AND 21<sup>ST</sup> CENTURY SKILLS DEVELOPMENT**

This event provides opportunity for students to build and develop leadership and 21<sup>st</sup> century skills including but not limited to:

- Communication
- Collaboration/Social Skills
- Initiative
- Problem Solving/Risk Taking
- Critical Thinking
- Perseverance/Grit
- Creativity
- Relationship Building/Teamwork
- Dependability/Integrity
- Flexibility/Adaptability

**CAREERS RELATED TO THIS EVENT**

This competition has connections to one (1) or more of the careers below:

- Data scientist
- Data analyst
- Actuary
- Economist
- Epidemiologist
- Forensic accountant
- Market researcher
- Meteorologist
- Operations research analyst
- Quality engineer

# DATA SCIENCE AND ANALYTICS

## 2023 & 2024 OFFICIAL RATING FORM

### HIGH SCHOOL

Judges: Using minimal (1-4 points), adequate (5-8 points), or exemplary (9-10 points) performance levels as a guideline in the rating form, record the scores earned for the event criteria in the column spaces to the right. The X1 or X2 notation in the criteria column is a multiplier factor for determining the points earned. (Example: an "adequate" score of 7 for an X1 criterion = 7 points; an "adequate" score of 7 for an X2 criterion = 14 points.) A score of zero (0) is acceptable if the minimal performance for any criterion is not met.

#### Go/No Go Specifications

- Before judging the entry, ensure that the items below are present; indicate presence with a check mark in the box.
- If an item is missing, leave the box next to the item blank and place a check mark in the box labeled ENTRY NOT EVALUATED.
- If a check mark is placed in the ENTRY NOT EVALUATED box, the entry is not to be judged.

- ☐ TIER 1 – Documentation portfolio was submitted pre-conference
- ☐ TIER 2 – Scientific Poster Presentation is present
- ☐ ENTRY NOT EVALUATED

TIER 1 – DOCUMENTATION PORTFOLIO (70 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
<b>Portfolio</b> (X1)	Portfolio is unorganized and/or missing three (3) or more components.	Portfolio has most components and it is somewhat organized.	One (1) or no components are missing in the portfolio; content and organization are clearly evident.	
<b>Introduction, Data Overview, and Data Dictionary</b> (X1)	Definition and explanation of the issue and data are unclear.	Issue and data is somewhat defined and explained.	Clear and concise definition and explanation of the issue and data are evident.	
<b>Purpose and Methods</b> (X1)	Research is inadequate, and/or very few credible sources are referenced.	Research has been conducted appropriately, with some credible sources included.	Research indicates evidence of a comprehensive assortment of materials that are credible sources.	
<b>Results</b> (X2)	The data is not represented in charts and graphs.	The data is represented in charts and graphs and somewhat supports the analysis of the team.	The data is represented in charts and graphs and supports the analysis of the team.	
<b>Conclusions and Next Steps</b> (X1)	Support materials do not help clarify the documentation or are of little significance to the issue.	Support materials are appropriate and help supplement documentation by providing clarity to the issue.	Support materials are of excellent quality; if not original, they are cited; support materials clarify the issue.	
<b>Quality, Effectiveness, and Mechanics</b> (X1)	Portfolio appears to have been thrown together; distracting errors in punctuation, grammar, and spelling are evident in the documentation.	Portfolio is generally organized; punctuation, grammar, and spelling are generally correct, with few errors.	Work is of exceptional quality and well organized; punctuation, grammar, and spelling are correct, with no errors.	
<b>TIER 1 – DOCUMENTATION PORTFOLIO SUBTOTAL (70 points)</b>				

TIER 2 – SCIENTIFIC POSTER PRESENTATION (90 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
<b>Definition and Explanation of the Issue</b> (X1)	An unclear definition and explanation of the issue is presented.	Issue is defined and explained adequately.	The portfolio is clearly organized and has either one or no missing components.	
<b>Explanation of Impacts</b> (X1)	Explanation is missing a discussion of the issue's relevance to environmental, economic, social, and/or ethical considerations.	Explanation addresses some of the issues relevant to environmental, economic, social, and/or ethical considerations.	Explanation includes a full discussion of the issue's relevance to environmental, economic, social, and/or ethical considerations.	
<b>Supporting Information</b> (X2)	Support information is not represented in graphs/charts and does not help to clarify documentation, and/or it is of little significance to the issue.	Support information is represented in graphs/charts, is somewhat appropriate and helps supplement the documentation by providing some clarity to the issue.	Support information is represented in graphs/charts, is highly effective and of excellent quality.	
<b>Research, References, and Resources</b> (X1)	Documentation lacks an adequate research base, and/or very few credible sources are referenced.	Research is conducted appropriately, with adequate credible sources.	Comprehensive research base that includes credible sources is evident.	
<b>Communication of the project</b> (X2)	It is difficult to understand the project being communicated; an illogical explanation presented; leadership and/or 21 <sup>st</sup> century skills are not evident.	The project is communicated to some degree although some illogical inconsistencies exist; leadership and/or 21 <sup>st</sup> century skills are somewhat evident.	The issue is communicated in an organized, clear, and concise manner; leadership and/or 21 <sup>st</sup> century skills are evident.	
<b>Creativity</b> (X1)	The display lacks creativity; no, or very few, design principles are integrated in the display.	Some elements of creativity exist in the display, and essential design principles are generally evident.	The display exudes creativity; essential design principles and elements are well integrated.	
<b>Aesthetics and Artisanship</b> (X1)	Work is unorganized and sloppy; display seems to be an afterthought or thrown together.	Display shows an organized presentation of the issue.	Display is exemplary in logically communicating important data.	
<b>TIER 2 – SCIENTIFIC POSTER PRESENTATION SUBTOTAL (90 points)</b>				
Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right.  Indicate the rule violated: _____				
<b>PRELIMINARY SUBTOTAL (160 points)</b>				

VISUALIZATION AND SYNOPOSIS (80 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
<b>Conceptualization</b> (X2)	It is difficult to understand the concept being communicated in the visualization and synopsis.	The concept is somewhat communicated, but many aspects remain unclear.	The concept is communicated in an organized, clear, and concise manner.	
<b>Creativity</b> (X2)	The visualization lacks creativity; no, or very few, design principles are integrated in the visualization.	Some elements of creativity are expressed, with most design principles integrated.	The visualization exudes creativity; essential design principles and elements are integrated.	
<b>Aesthetics and Artisanship</b> (X1)	Unorganized, sloppy work is evident; the visualization seems to be an afterthought and/or thrown together.	A largely organized presentation of layout and design principles is evident.	An exemplary use of layout and design principles to logically communicate important data is evident.	
<b>Graphical Representations</b> (X2)	Graphical representations do not help to clarify visualization, or they are of little significance to the project.	Graphical representations are appropriate and help supplement the visualization by providing clarity to the project.	Graphical representations are of excellent quality; and clarify abstract concepts.	
<b>Originality</b> (X1)	The visualization lacks imagination, originality, and artistic detail.	The visualization is somewhat effective, inventive, and inspiring.	The visualization is inspiring, inventive, resourceful, and motivating.	
<b>VISUALIZATION AND SYNOPOSIS SUBTOTAL (80 points)</b>				
Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right.  Indicate the rule violated: _____				
<b>SEMIFINAL SUBTOTAL (80 points)</b>				
To arrive at the TOTAL score, add any subtotals and subtract rules violation points, as necessary. <b>TOTAL (240 points)</b>				

Comments:

I certify these results to be true and accurate to the best of my knowledge.

**JUDGE**

Printed name: \_\_\_\_\_ Signature: \_\_\_\_\_

# DATA SCIENCE & ANALYTICS

## EVENT COORDINATOR INSTRUCTIONS

### PERSONNEL

- A. Event coordinator
- B. Judges:
  1. Preliminary round, two (2) or more (documentation)
  2. Preliminary Round: Two (2) or more (presentation)
  3. Semifinal Round: Two (2) or more (preferably the same judges from the preliminary round)

### MATERIALS

- A. Coordinator's packet, containing:
  1. Event guidelines, one (1) copy for the coordinator and for each judge
  2. TSA Event Coordinator Report
  3. List of judges/assistants
  4. Stick-on labels for identifying entries (only 1 set)
  5. Results envelope with coordinator forms
- B. Table and chairs for event coordinator and judges
- C. Twelve (12) TSA-provided USB thumbdrives with semifinalist on-site problem (data set)
- D. Laptop that is able to open a PDF from a USB

### RESPONSIBILITIES

#### PRE-CONFERENCE/PRELIMINARY ROUND

- A. National TSA will collect entries until 11:59 p.m. ET on a designated date in mid-May and send out receipt confirmations to participant(s). The results will be shared with the CRC manager, event coordinator, and assigned judges.
- B. Review entries as they are submitted to the designated online storage utility.
- C. Manage communication and Pre-conference evaluation (at least two [2] or more judges should be recruited earlier in the year). Coordinate with National TSA and/or the Judge Manager.
- D. Judges determine the twenty-four (24) preliminary contestants for the on-site challenge, and discuss and break any ties.

#### AT THE CONFERENCE

- A. Attend the mandatory event coordinator's meeting at the designated time and location.
- B. Report to the CRC room and obtain the contents of the coordinator's packet; check the contents.
- C. Review the event guidelines and check to see that enough judges have been scheduled.
- D. Inspect the area(s) in which the event is to be held for appropriate set-up, including room size, tables, chairs, etc. Notify the event manager of any potential problems.
- E. At least one (1) hour before the event is to begin, meet with judges and assistants to review time limits, procedures, regulations, evaluation, and all other details related to the event. If questions arise that cannot be answered, speak to the event manager before the event begins.

#### PRELIMINARY ROUND

- A. A list of twenty-four (24) preliminary round participants will be posted on the first full day of conference.
- B. Preliminary round presentation participants report to the event area at the time and place stated in the conference program to sign-up for a presentation time.
- C. Participants report at the assigned time and place with a digital copy of the scientific poster for their presentation on their own device.
- D. Manage the on-site presentations/interviews.
- E. Judges assess the entries and may ask questions.
- F. Decisions about rules violations must be discussed and verified with the judges, event coordinator, and CRC manager to determine either:
  1. To deduct twenty percent (20%) of the total possible points in this round or
  2. To disqualify the entry

The event coordinator, judges, and CRC manager must initial either of these actions on the rating form.

- G. Judges determine the twelve (12) semifinalists.
- H. Submit the semifinalist results and all required forms in the results envelope to the CRC room.

### SEMIFINAL ROUND

- A. Judges report at the time and location referenced in the conference program for the on-site semifinalist problem.
- B. Semifinal participant(s) have two (2) hours to submit their entries on the TSA-provided thumb drive in PDF format.
- C. Judges use the same official rating form for both the preliminary and semifinal round of evaluation.
- D. Discuss rule violations (e.g. 20% deduction, disqualification) and have all relevant parties initial the rating form.
- E. Judges determine the ten (10) finalists.
- F. Submit the finalist results and all required forms in the results envelope to the CRC room.