

## **TSA High School Themes and Problems**

### [Animatronics](#)

Design Problem: Create an animatronic exhibit for the entrance of a children's hospital waiting room. Refer to section "F" in General Rules and Regulations.

### [Architectural Design](#)

#### [Design Problem](#)

### [Biotechnology Design](#)

Design Challenge: You are employed by an environmental protection company that has been asked to create a solution to control or eradicate cyanobacteria, also known as blue green algae.

### [Children's Stories](#)

Theme: Create a book for students in pre-k to 1st grade that showcases/promotes engineering. The solution must also include an activity to accompany the book for teachers to use with their students. The activity needs to be a PDF file submitted at the end of the portfolio documentation.

### [Coding](#)

The following programming languages may be used to complete the assigned problems:

- C (version C11)
- C++ (version C++14)
- C# (version 6.0)
- Java (version 10)
- Javascript (NodeJS version 8.10)
- Python (version 3.6)
- Ruby (version 2.5)
- Swift (version 4.2)

Additional languages may become available as we near the conference.

Participants will be presented with a series of coding problems

that must be completed on site at the conference. Evaluation will be based on the successful completion of the problems and the time in which it takes students or teams to complete all the challenges.

In addition to the specific HS Coding competition rules and regulations, students also must adhere to TSA's general rules (found in the HS competitive events guide).

The USA Computing Olympiad website and the ACM-ICPC International website are helpful resources for the Coding event. Additional resources that can be used to prepare for the event are listed below:

- <https://icpc.baylor.edu/compete/preparation>
- <https://www.codechef.com/>
- <http://www.usaco.org/index.php?page=contests>
- [http://blog.hackerearth.com/2013/09/competitive-programming-getting-started\\_11.html](http://blog.hackerearth.com/2013/09/competitive-programming-getting-started_11.html)
- <https://www.quora.com/What-is-the-best-strategy-to-improve-my-skills-in-competitive-programming-in-2-3-months>

### [Computer Integrated Manufacturing \(CIM\)](#)

Design Challenge: Create an original design and build an ice cream scoop.

### [Debating Technological Issues](#)

Theme: Americans rely daily on the internet for information, education, and social media

Subtopics:

- Medical research being available online
- Remote learning for K-12 education
- Companies tracking data using cell phones

### [Digital Video Production](#)

Design Challenge: A day in the life - self, school, family, friends, etc.

### [Engineering Design](#)

Restore and improve an urban infrastructure

### [Fashion Design and Technology](#)

Theme: Amusement theme parks open new attractions and rides annually. Create three (3) different prototypes of attire for park employees who operate a new family-friendly ride called the "Power Charger." The park is open during all seasons throughout the year and this new ride has the color theme of red, white, and navy blue. One (1) of the three (3) prototypes is submitted for evaluation.

### [Geospatial Technology](#)

Theme: Research a local, regional, state, or national manufacturing issue

### [Photographic Technology](#)

Theme: Challenges - personal, school, family, friends, etc.

### [Promotional Design](#)

Design Challenge: Your school is hosting a student organization fair to promote clubs and activities. You have the responsibility of developing promotional materials to hand out to students at the fair who are interested in joining the TSA chapter. All items are to be placed into a two-pocket folder. All student and school names must be fictitious.

### [Structural Design and Engineering](#)

#### [Problem Statement](#)

#### [Team Verification Form](#)

#### [Analysis and Assessment Form](#)

## [Transportation Modeling](#)

Theme: History of package or product delivery vehicles

## [Video Game Design](#)

Theme: An arcade game for a museum.

Refer to section “F” in General Rules and Regulations.

Note: The URL must point to the team’s entry. Entries that require a software download, running an executable file (.exe), or a request that access be granted will not be judged.

## [Webmaster](#)

Theme: A virtual event

Context: Due to the global pandemic, in-person events have not been held as in the past. Instead of canceling or postponing events, many organizers chose to hold them virtually. These virtual events had to be interactive and provide participants similar experiences as in-person events.

Challenge: Create a fictitious virtual event and design an accompanying website. The website should identify the type of event, serve as an information guide, and include the virtual experiences related to the event. Sections of the site may include photos, product descriptions, renderings history, contact, and news updates. Present an overview of event details as if you were a consumer.