

# High School Themes and Problems



## ANIMATRONICS

**Design Problem:** Following the specified requirements, create an animatronic exhibit for a public library to excite young readers.

## ARCHITECTURAL DESIGN

- **Design Problem**

## AUDIO PODCASTING

**Theme:** Preparing to compete in a TSA event and/or preparing for your first TSA conference.

## BIOTECHNOLOGY DESIGN

**Topic:** Tissue Engineering. Tissue Engineering is a biomedical engineering discipline that uses a combination of cells, engineering, materials methods, and suitable biochemical and physicochemical factors to restore, maintain, improve, or replace different types of biological tissues.

## CHILDREN'S STORIES

**Theme:** Create a “touch and feel” or interactive storybook that introduces TSA and its benefits to young readers in an engaging manner.

## CODING

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

- C version C17
- C++ version C++20
- C# version 8
- Java version 21.0
- Javascript/Node version 18.19
- Python version 3.9
- Ruby version 3.2
- Rust version 1.75
- Swift version 5.10

## DATA SCIENCE & ANALYTICS

**Theme:** Identify and use a “Real Estate,” “Housing,” and/or “Community” related open-source data set for your analyses and research. In the scientific poster, cite the source of the data, including the URL/domain and file format.

## DEBATING TECHNOLOGICAL ISSUES

**Topic:** Biotechnology

- **Subtopic 1:** Biometric identification poses a security threat within the digital world.
- **Subtopic 2:** Gene-editing biotechnologies such as the CRISPR-Cas9 system, set a dangerous precedent for science applications in healthcare.
- **Subtopic 3:** Brain interface technologies, such as Elon Musk’s Neuralink, provide a unique and beneficial solution to mental health issues.

## DIGITAL VIDEO PRODUCTION

**Theme:** Create a short film that includes at least 30 seconds of animation

## DRAGSTER

Address weights and lengths only; there are no special design challenges.

## DRONE CHALLENGE (UAV)

- **Dinosaur Rescue**

## ENGINEERING DESIGN

**Theme:** Manage the nitrogen cycle

## FASHION DESIGN AND TECHNOLOGY

**Theme:** Create a prototype of a marching band uniform for a performance with the theme of “Earth, Wind, Fire, Water.” The prototype must include a type of wearable technology. No pyrotechnics or ignitable elements are permitted.

Teams will submit one (1) or two (2) garments for judging (top and bottom or one [1]-piece.) All required components must fit inside a 32-quart plastic container. Any accessories (hats, gloves, boots, etc.) may be used during semifinalist presentations, however, they are not submitted in the preliminary round.

# High School Themes and Problems

(continued)



## GEOSPATIAL TECHNOLOGY

**Theme:** Identify a disaster threat, natural or otherwise, that may impact your community. Develop an infographic that communicates hazard zones, evacuation routes, and resource distribution.

## MANUFACTURING PROTOTYPE

**Theme:** An item that can be used as picture frames for a home or office while also serving another purpose.

## MUSIC PRODUCTION

**Theme:** Create a musical piece that will be used as the background music for a role-playing game (RPG) video game. It will be played during the parts of the game when the player's character is visiting the blacksmith.

## PHOTOGRAPHIC TECHNOLOGY

**Theme:** Using five photographs, tell a story about your journey in TSA. The type of photo (color, black and white, macro, still life, and student choice) should add to the impact of the story you are sharing.

## PREPARED PRESENTATION

**Theme:** Develop a presentation that highlights the field of digital music production, including the timeline of its origin, development, fruition, and release of the technology on a global scale.

## PROMOTIONAL DESIGN

**Theme:** Branding materials for a fictitious restaurant; the four (4) Promotional Folder items are student choice.

## ROBOTICS

- [Design Problem](#)

## SOFTWARE DEVELOPMENT

Develop a program that enhances the environment and/or agriculture to be more sustainable and efficient.

## STEM MASS MEDIA

Brain-computer interfaces (BCIs) are advanced technologies that enable direct communication between the brain and computers. Using electrodes placed on the scalp, BCIs detect brain signals that are then translated into commands for computers. These signals can control various applications, from typing messages to playing video games, solely through thought. BCIs have practical applications beyond entertainment; they assist individuals with disabilities by allowing them to operate prosthetic limbs or communicate when speech is impaired. BCIs represent a remarkable intersection of neuroscience and computer science, offering promising solutions for both medical and technological advancements.

Based on the following headline (link below), develop a news broadcast that includes an introduction of the headline, a summary of the information in the news story, and an explanation of potential future implications of the highlighted work.

[www.eurekalert.org/news-releases/1039721](http://www.eurekalert.org/news-releases/1039721)

## STRUCTURAL DESIGN AND ENGINEERING

- [Problem Statement](#)
- [Verification Form](#)

## TRANSPORTATION MODELING

**Design Problem:** Food trucks

## VIDEO GAME DESIGN

**Theme:** Kid's game, 2 to 4 players, playable on one (1) screen and one (1) keyboard at a time.

## VIRTUAL REALITY VISUALIZATION (VR)

**Theme:** Create a virtual reality (VR) simulation of a family vacation destination that includes experiences and activities that appeal to both young children and teenagers.

## WEBMASTER

**Topic:** A restaurant (dine-in and carry-out) that specializes in vegetarian food.

**Challenge:** Design a website for a vegan/vegetarian restaurant. Showcase the restaurant's approach (such as farm-to-table, preparation processes, and sustainability) to the food served in the restaurant.