High School Themes and Problems

Animatronics

Design Problem: Turning classic tales into a mechanical marvel. Bring a story to life following the Animatronics rules.

Architectural Design

Design Problem

Audio Podcasting

Theme: “The Debate Desk”

Students create an audio podcast presenting multiple perspectives on a controversial topic in STEM, society, education, health, or the environment.

Biotechnology Design

Topic: Biosensors for Disease Detection

Biosensors use biological molecules, cells, or enzymes to detect specific chemicals or disease markers. These tools are increasingly important in medical diagnostics, environmental monitoring, and food safety. Present the science behind biosensors and demonstrate one use of biosensor technology in detecting or monitoring disease.

Career Prep

Theme: Choose a career from the Career Clusters Digital Technology category within one of the following subclusters:

- Data Science & Artificial Intelligence
- Information Technology (IT) Support & Services
- Network Systems & Cybersecurity
- Software Solutions
- Unmanned Vehicle Technology

Children's Stories

Theme: A graphic novel/comic book. Binding cannot be stapled.

Data Science and Analytics

Theme: Identify and use one AI-generated dataset related to Climate and Environmental Sustainability for analysis and research. Competitors may use an artificial intelligence tool to create the dataset, provide the resulting data file in a structured format (such as CSV, XLSX, or JSON), and cite the artificial intelligence tool, model (if available), and prompts or queries used to generate the dataset.

Scientific Poster Template

Debating Technological Issues

Theme: Artificial Intelligence in Medicine

- **Topic 1:** AI diagnostic tools should be allowed to make medical decisions without final approval from a physician.
- **Topic 2:** The use of AI in healthcare will improve access to care more than it will increase medical bias.
- **Topic 3:** Patients should have the right to know when AI is involved in their diagnosis or treatment plan.

Digital Video Production

Theme: Create an infomercial with a product and in the style of the 1990s.

Dragster

Theme: INSIDE / OUT

One axle (front or rear) must use internal wheels, while the opposite axle must use external wheels.

Internal: The wheels must be enclosed by the vehicle body on the top and both sides above the axle. The bottom of the wheel remains exposed.

External: The wheels must be completely outside the vehicle body. No portion of the body may cover any part of the wheel from the top or sides.

The front and rear axles must use opposite configurations (one internal, one external).

One set of wheels(front or rear) must be external (outside 35mm) and the other set of wheels must be internal(shell). Participant choice on either Front or Rear.

Drone Challenge (UAV)

Theme: Humanitarian Aid and Rescue

Engineering Design

Theme: Engineering the Future of Energy: engineering solutions that improve the generation, storage, conservation, distribution, or use of energy.

Fashion Design and Technology

Theme: Fashion created from recycled or repurposed materials. One complete outfit; a maximum of two (2) garments. Garment accessories for semifinal round only.

Design can incorporate new/purchased materials, but the majority of the final garment must be recycled.

Hybrid Racer XL

Annual Design Requirement

Must attach and pull/drag one 5-ounce fishing weight, provided on-site. Design must include a hitch to attach weight at rear of car. The weight must touch the floor surface throughout the race(s). Tow line of 36" of fishing line and fishing weights provided on site. Sample of fishing weight: https://a.co/d/05yQLCZx

A model solar track on top of carpet will be the floor surface at the 2027 National TSA Conference.

Interior Design

Design Challenge: Tiny Living, Big Impact

A nonprofit organization is developing a Tiny Home Community for young adults transitioning into independent living.

Your firm has been selected to design the interior of one model home that maximizes comfort, storage, functionality, and affordability within a limited footprint.

The home should feel welcoming while demonstrating innovative space-saving solutions.

Required Spaces

Include:

- Living area
- Kitchenette
- Sleeping area
- Bathroom
- Workspace
- Storage

Design Considerations

Students should demonstrate:

- Multifunctional furniture
- Universal Design principles
- Sustainable materials
- Efficient circulation
- Creative storage solutions
- Residential lighting design

Budget
Material budget: **$28,000**

Manufacturing Prototype

Theme: Display or container for small collectible items

Music Production

Theme: Compose an original, dynamic soundtrack for a climactic boss battle in a futuristic or fantasy video game. Your music should portray the intensity of the encounter through creative composition, sound design, and production techniques. The track should build escalating tension, feature dramatic contrasts and powerful climaxes, and be suitable for seamless looping during continuous gameplay.

Photographic Technology

Theme: Behind the scenes

Prepared Presentation

Theme: Many technologies begin as science fiction before becoming reality. Choose one technology that was once considered futuristic and is now used today. Describe its development, current applications, and how it may continue to evolve in the future.

Promotional Design

Theme: Milestone Diner, a new retro-inspired American diner, is preparing for its grand opening. You have been hired to create a cohesive brand identity and promotional materials that celebrate the diner's nostalgic 1978 inspiration while attracting today's customers. The restaurant's branding should reflect a nostalgic late-1970s aesthetic while remaining inviting, family-friendly, and appealing to a modern audience.
The following items are the required design pieces:
Item #1 – Restaurant Logo
Design a logo for Milestone Diner. The logo should be submitted enlarged on a 8.5" × 11" sheet of paper (portrait or landscape, designer's choice). The logo should establish the restaurant's visual identity and be appropriate for use across all required promotional materials.
Item #2 – Restaurant Menu
Design a bifold restaurant menu for Milestone Diner using tabloid-size paper (11" × 17"). The menu should be designed so the front and back panels are correctly positioned for printing and folding. Participants should create original menu item names, descriptions, and pricing appropriate for a classic American diner.
Item #3 – General Manager Business Card
Design a single-sided business card for the General Manager of Milestone Diner. The business card should reflect the restaurant's established brand identity while presenting the required contact information in a professional, well-organized layout.
Item #4 – Instagram Grand Opening Advertisement
Design a static Instagram graphic (4:5 vertical ratio) promoting the Grand Opening of Milestone Diner. The advertisement should capture attention, encourage attendance, and maintain the restaurant's established visual identity.

Use the following details for the design challenge:

Restaurant Name: Milestone Diner
Address: 1978 Celebration Boulevard
Orlando, FL 32819
Phone: (407) 555-1978
General Manager: Delmar Olson
Email: manager@milestonediner.com
Grand Opening Date: July 1, 2027

Robotics

Theme

Software Development

Develop a software application that improves how people learn, teach, practice, or develop new skills. Competitors should identify an educational or training challenge affecting learners of any age and design an engaging, effective, and user-centered software solution.

STEM Mass Media

Headline: Scientists link human right-handedness to walking upright and brain evolution

Background:

Most humans favor their right hand, but scientists have long debated why this pattern is so common across cultures. Unlike humans, other primates do not show the same strong population-wide preference for one hand. A new Oxford-led study published in PLOS Biology suggests that human right-handedness may be connected to two major steps in human evolution: walking upright on two legs and the expansion of the brain. Researchers analyzed data from 2,025 individuals across 41 species of monkeys and apes, using evolutionary modeling to compare possible explanations for handedness, including tool use, diet, habitat, body size, social behavior, brain size, and locomotion. Their findings suggest that as early human ancestors became more fully bipedal and developed larger brains, right-handedness became increasingly common. The study also raises new questions about why left-handedness still exists and whether similar patterns of limb preference in other animals may have evolved in comparable ways.

Prompt:
Based on the following headline, 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.

https://www.eurekalert.org/news-releases/1128472

Structural Design and Engineering

Problem Statement

Transportation Modeling

Design Problem: Cartoon/comic vehicles

No copyright vehicles or symbols may be used. Students may use existing cartoon or comic cars as inspiration only.

Video Game Design

Theme: Create a deep space-themed RPG where the primary method of progression is puzzle-solving rather than combat.

Challenge: Your game must include core RPG elements (such as character stats, a leveling system, or branching dialogue), but you may not include traditional combat. Instead, players must use their character's skills and stats to solve environmental, logical, or social puzzles to survive the dangers of deep space.

Virtual Reality Simulation (VR)

Theme: High-speed first aid immersive simulation

Challenge: You are tasked with developing a virtual reality experience that evaluates a user's ability to perform life-saving interventions under pressure, such as addressing anaphylaxis, obstructed airways, or traumatic hemorrhaging. The simulation must feature a comprehensive Training Mode that provides instructional support and immediate guidance in a controlled setting. Additionally, your project must include a rigorous Certification Mode that simulates a realistic, time-sensitive emergency with no assistance. Your final product must produce a performance analytics dashboard summarizing the user's technical proficiency and response efficiency.

Vlogging

Theme: The Butterfly Effect

Small actions can create extraordinary change.

Create a **three-episode vlog series, not to exceed six minutes total,** that explores how one decision, act of kindness, innovation, challenge, or moment can lead to a chain of events that produces a meaningful impact. Your vlog should demonstrate how seemingly small actions can inspire growth, influence others, and create lasting change.

Your series should follow a connected storyline across all three episodes, capturing authentic experiences, thoughtful reflection, and engaging storytelling. Through creative videography, editing, and presentation, illustrate how one small action can spark a ripple effect that extends far beyond its original moment.

Webmaster

Theme: Artificial Intelligence (AI) learning portal

Challenge: You have been tasked with designing and developing an interactive Artificial Intelligence (AI) learning portal aimed at high school students (grades 9–12). The purpose of this site is to demystify AI by providing a foundational understanding of the technology, showcasing practical tools, and teaching techniques to leverage AI effectively and ethically in an academic setting.

Your website must include the following:

- **Educational Content Modules:** At least three distinct learning sections covering fundamental AI concepts, practical AI tools/techniques, and ethical AI usage
- **Gamification & Progress Tracking:** An interactive, gamified user interface (e.g., digital badges, experience points, or a progress dashboard) designed to engage students and visually track their completion of the learning modules.