

Contest Overview: Design Horizons - Reimagining the Ideal Schoolyard

Contest Theme

This year's contest challenges students to reimagine their **Ideal schoolyard** by designing a new item or feature that enhances outdoor spaces for learning, play, and/or community engagement. Using **orthographic drawings** and a **one-point perspective ideation sketch**, students will introduce at least one new element incorporating one or two of the following structural types: **solid structure, frame structure, and/or shell structure**. Examples might include an **outdoor classroom, an amphitheatre, or a new play area feature**. This contest encourages **creativity, innovation, and problem-solving** while helping students explore design principles and engineering concepts in a meaningful way.

Background Information

Design drawing is a powerful tool for **visualizing and communicating ideas**. It involves sketching, drafting, and technical illustration to bring concepts to life. This contest, inspired by **SciTechOntario's and OCTE's resources [From Sketch to Creation: A CAD Journey](#)**, emphasizes **creative thinking, observation, and technical drawing skills**, preparing students for real-world design and career pathways.

Learning Goals and Success Criteria

Learning Goals:

- Apply **design drawing principles** to create an innovative schoolyard feature.
- Understand how **structural types (solid, frame, and shell)** impact design and function.
- Explore real-world applications of **engineering and design** in outdoor spaces.

Success Criteria:

- Students effectively communicate their **design concept** through **orthographic drawings** and a **one-point perspective ideation sketch**.
- Students explain their **design choices** in relation to **structural stability, usability, and innovation**.

Challenge:

Students will work **individually or in teams of two** to design an item for their schoolyard that meets the following criteria:

- Incorporates at least **one new feature or structure** for their schoolyard.
- Utilizes **one or two structural types** (solid, frame, shell).
- Clearly demonstrates **design intent** through **orthographic drawings** and a **one-point perspective sketch**.

Note: While students are **not required** to build a physical or digital model, they are welcome to do so as an extension activity.

Evaluation:

<p>Design Drawing (Orthographic & One-Point Perspective)</p> <ul style="list-style-type: none">- The orthographic drawing(s) and one-point perspective sketch(es) clearly and accurately represent the proposed schoolyard feature.- Drawings include clear dimensions, labelling, and proportionality, adhering to the design requirements outlined in this challenge.	/ 25
<p>Creativity & Innovation:</p> <ul style="list-style-type: none">- The design reflects originality and creative problem-solving, offering a unique addition to the school year.- Demonstrates innovative use of structural types (solid, frame, and/or shell) while maintaining practicality and user engagement.	/ 25
<p>Understanding of Structural Types:</p> <ul style="list-style-type: none">- Clear demonstration of knowledge in applying solid, frame, and/or shell structures.- Thoughtful consideration of how chosen structures enhance stability, safety, and functionality in the schoolyard context.	/ 25
<p>Team Reflection on Design Decisions:</p> <ul style="list-style-type: none">- Reflective explanation of design choices, including how the selected structure(s) meet user (students and community members) needs and environmental considerations (such as the amount of outdoor space available, type of land and soil, etc.).- Insight into how the design process was influenced by structure knowledge and real-world applications in engineering and architecture.	/ 25
<p>Total Mark</p>	/100

Exemplar: The Green Canopy Learning Pavillion

Design Drawings

Orthographic Drawing

- Front, Side, and Top Views with Dimensions
- Represent The Green Canopy Learning Pavillion, an outdoor classroom space that features a frame and shell structure.
- The drawings include the following elements:

Front View: Displays the open-frame support beams and the translucent solar-panel roof structure.

Side View: Shows the slope of the shell-like canopy that provides natural shading and rain protection.

Top View: Illustrates the overall footprint, seating arrangement, and orientation in the schoolyard.



One-Point Perspective Sketch

- Sketch presents the spatial depth and real-world application of the learning pavilion.
- Demonstrates how the structure integrates with the schoolyard, showing students seated on curved wooden benches and enjoying a natural, well-ventilated lesson.
- Light filtering through the solar canopy highlights the pavilion
- Eco-friendly and multi-functional design.



Creativity & Innovation

The Green Canopy Learning Pavilion is an innovative approach to outdoor learning, promoting sustainability while addressing the need for flexible, all-weather educational spaces.

- **Originality:** Unlike traditional outdoor seating areas in, this pavilion uses renewable materials (bamboo, recycled plastic, and tempered glass panels) for durability and environmental responsibility.
- **Structural Innovation:** The frame structure consists of modular beams, allowing for easy expansion. The shell structure (curved canopy) maximizes shade while incorporating solar panels that power outdoor lighting and charge electronic devices.
- **User Engagement:** The open yet covered space provides a multi-purpose setting for science experiments, art classes, reading spaces, and community events while ensuring protection from sun and rain.

Understanding of Structural Types

This project demonstrates a deep understanding of frame and shell structures through:

- **Frame Structure:** The pavilion is supported by lightweight but strong aluminum and bamboo beams, making it both cost-effective and earthquake-resistant.
- **Shell Structure:** The canopy's aerodynamic shape is inspired by nature's efficiency (like tree leaves). The curvature reduces wind resistance, improves water runoff, and adds architectural beauty.
- **Functionality & Safety:** The structural choices prioritize stability (anchored footings), weather resilience (wind and rain protection), and user safety (smooth, rounded edges on seating and railings).

Team Reflection on Design Decisions

Our design choices were shaped by practical considerations and real-world applications:

- **User Needs:** The pavilion creates a comfortable, shaded learning environment for both students and teachers. Its seating layout encourages collaborative learning and flexible use for various subjects and activities.
- **Environmental Considerations:** The structure was designed with minimal land disruption in mind. The raised foundation allows for natural water drainage, and the permeable flooring prevents soil erosion.
- **Structural Knowledge Impact:** Understanding frame structures allowed us to design a lightweight but strong pavilion, while the shell canopy was inspired by real-world architectural examples (e.g., sustainable bus stops and stadium roofs).
- **Future Expansion:** The modular frame design enables the school to expand seating or install additional solar panels in the future.

Conclusion

The Green Canopy Learning Pavilion enhances the schoolyard experience by blending engineering principles with sustainability and community engagement. By leveraging frame and shell structures, this design offers an innovative, practical, and inspiring outdoor learning space.

