Design Horizons

Reimagining The Ideal Schoolyard

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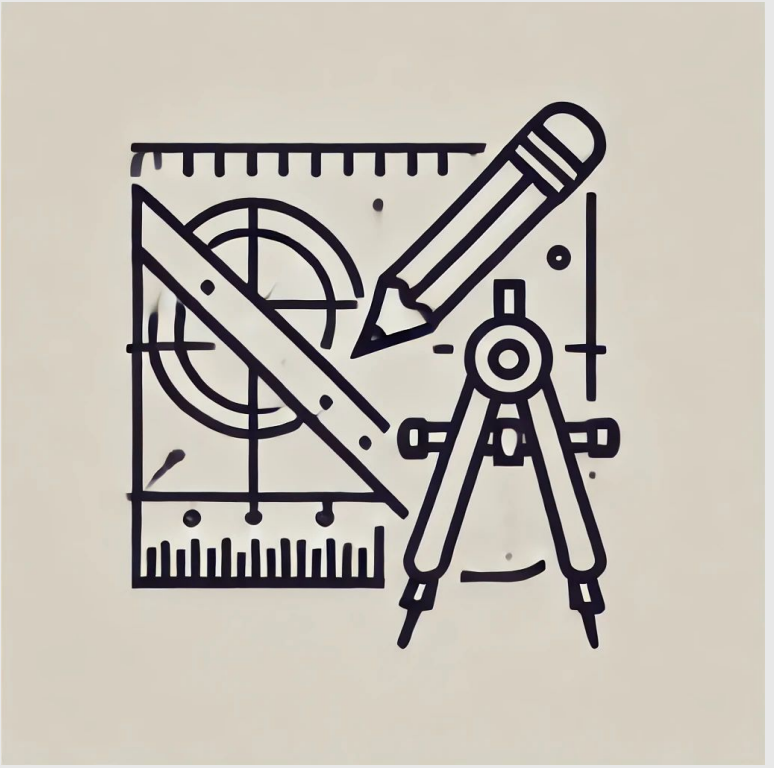
What Is Design Drawing?

- A **creative process** used to visually communicate ideas and concepts.
- Involves **sketching, drafting, and illustrating** to develop designs.
- Applied in **various fields** such as product design, architecture, and artwork.



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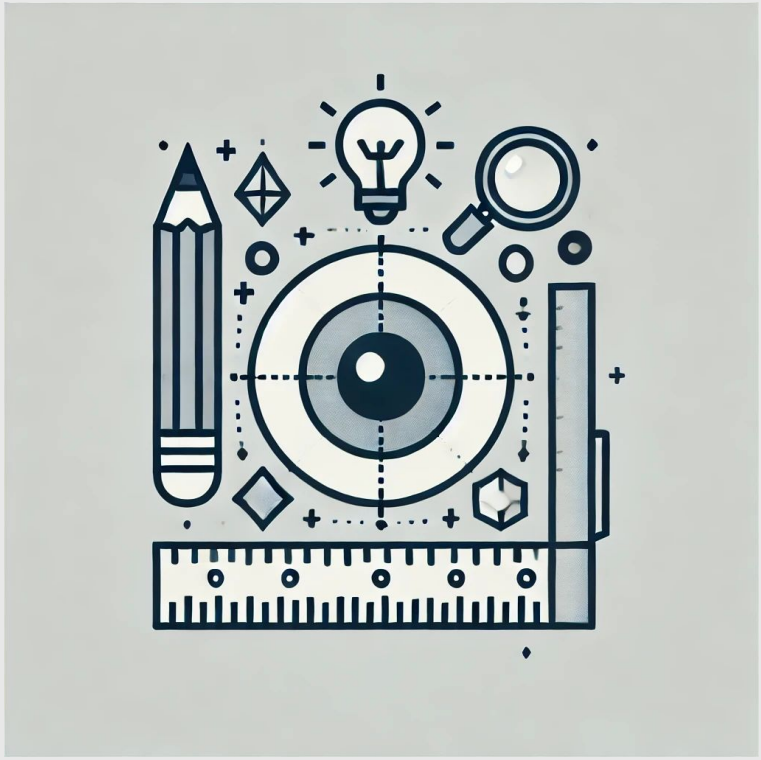

Key Skills In Design Drawing

- **Observation:** Noticing details and accurately representing them on paper or digitally.
- **Creativity:** Generating original and innovative ideas.
- **Technical Skills:** Using drawing tools and techniques effectively.
- **Attention to Detail:** Enhancing design quality by focusing on finer points.

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The Engineering Design Process

- **Structured approach** for problem-solving in science and technology.
- **Plan:** Research, understand the problem, and brainstorm solutions.
- **Prototype:** Develop and test a selected solution.
- **Test:** Evaluate and refine the prototype based on results.
- **Communicate:** Share solutions using appropriate methods for the audience.

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Introduction to Technical Drawings

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https://octe.ca/

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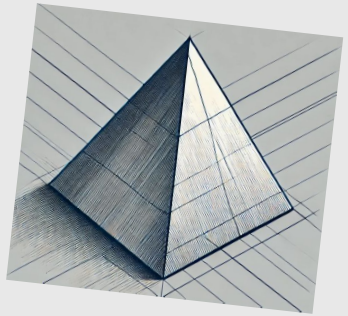
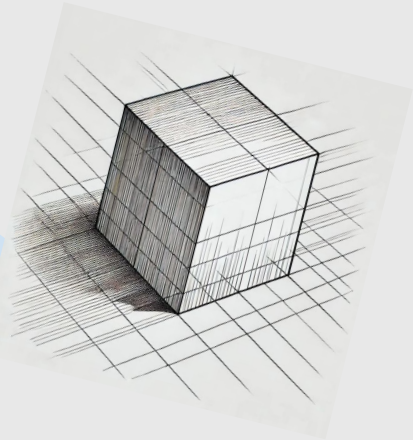
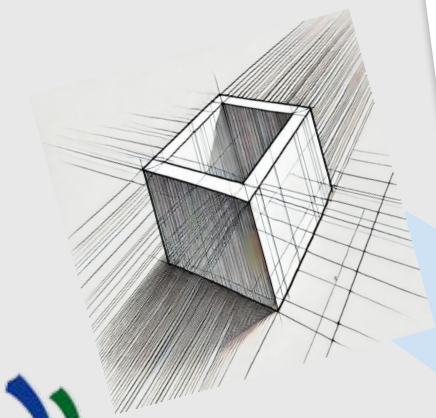
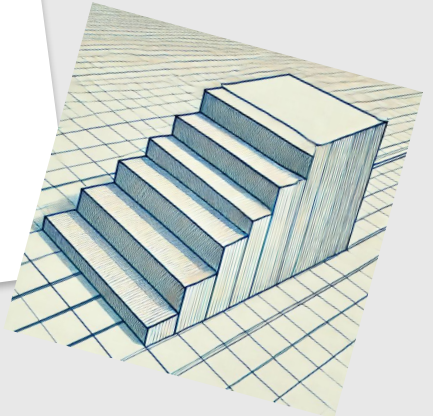




One-Point Perspective





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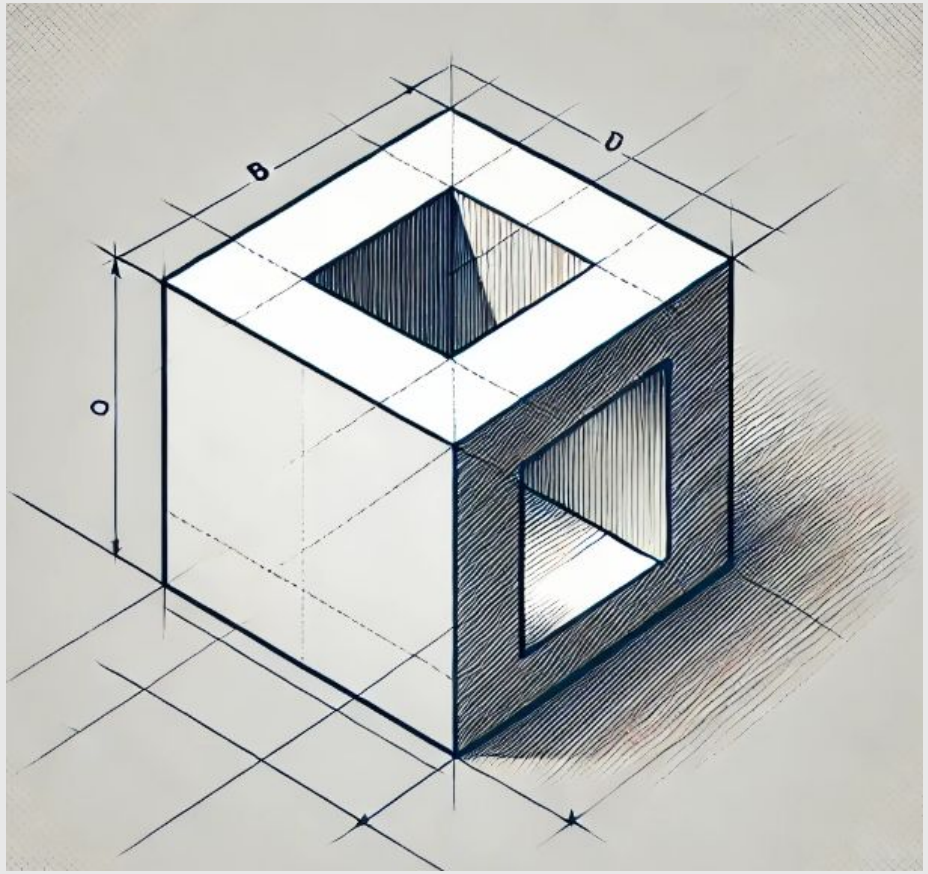

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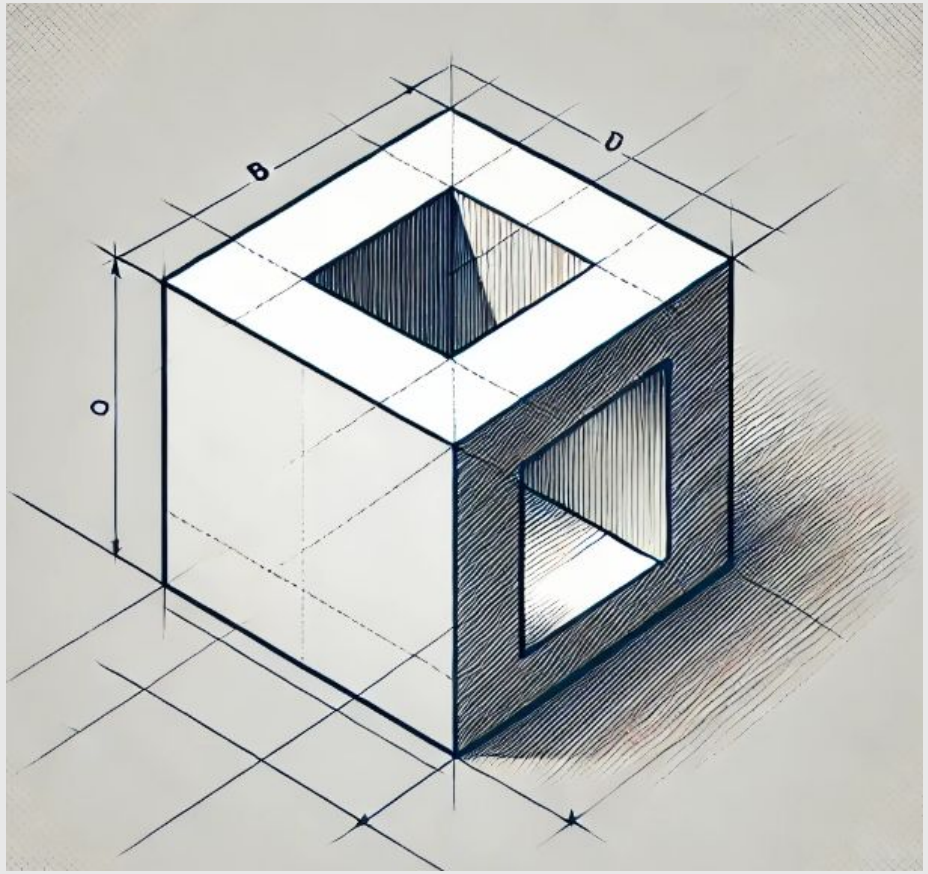
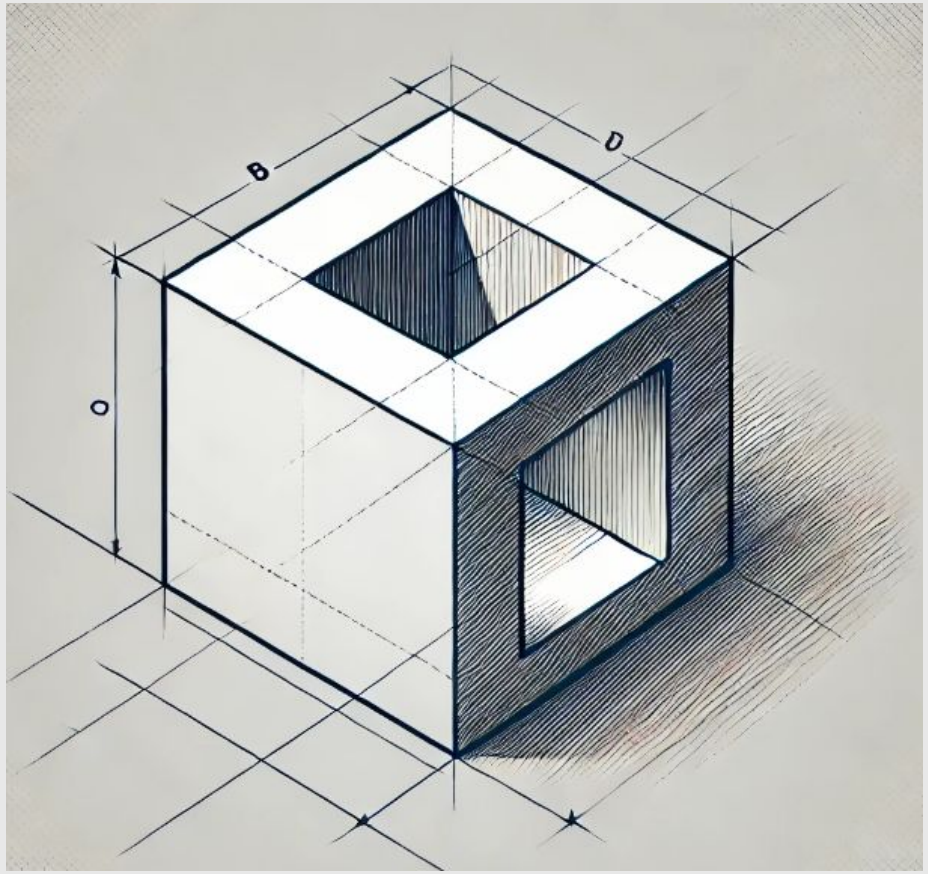


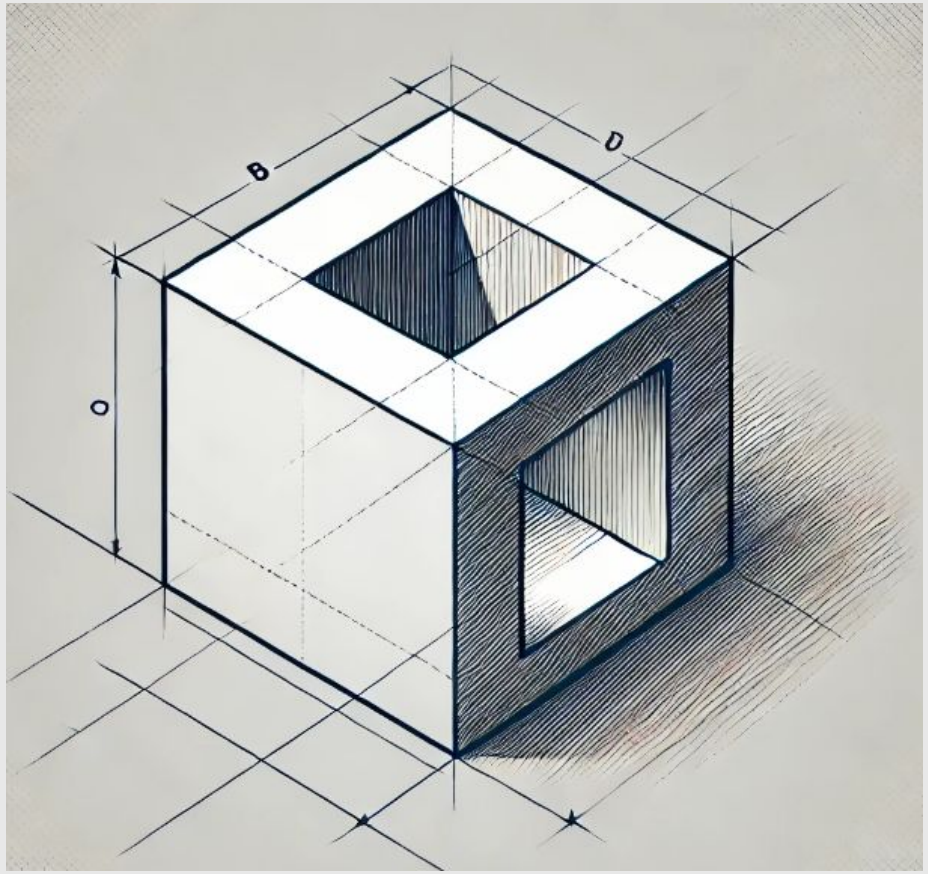
- Uses a single vanishing point

One-Point Perspective



- Uses a single vanishing point
- Lines converge at this point

One-Point Perspective



- Uses a single vanishing point
- Lines converge at this point
- Used in interior design and architectural sketches

One-Point Perspective

One-Point Perspective

Pros

Cons

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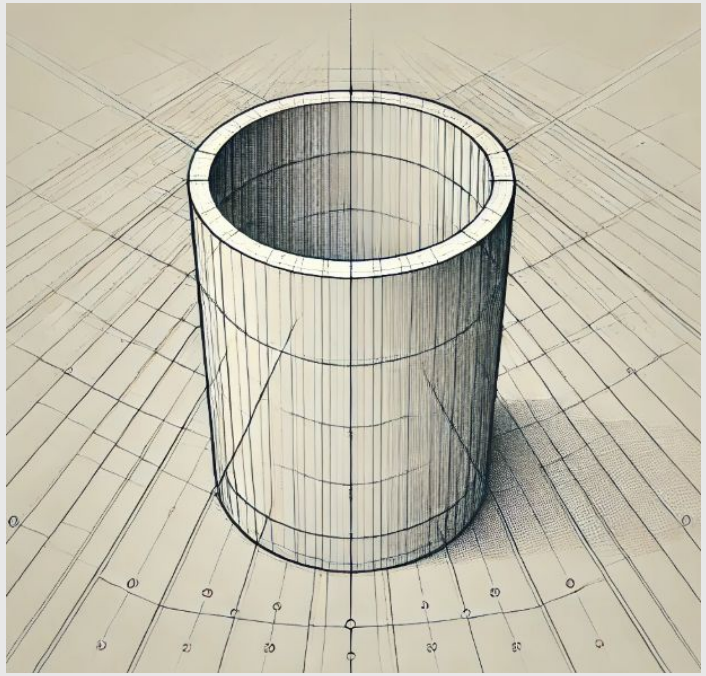
One-Point Perspective

Pros



Cons

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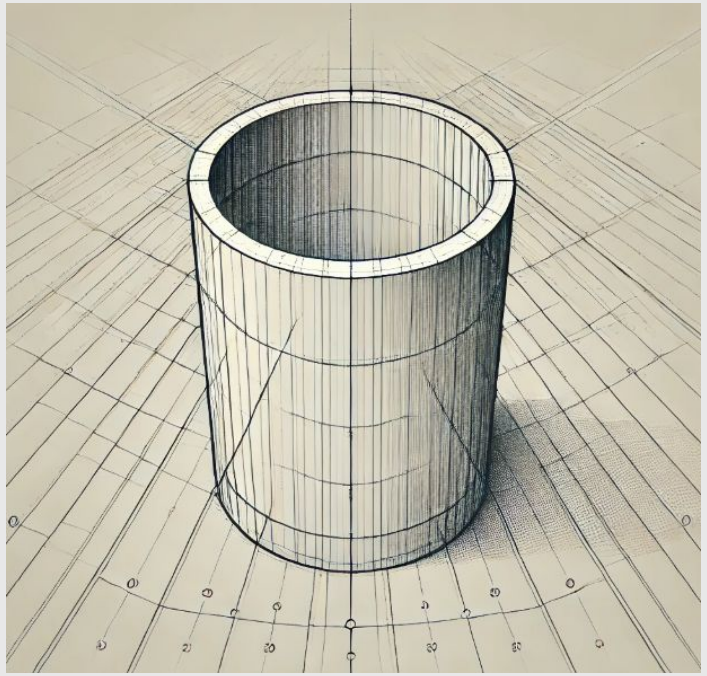
One-Point Perspective

Pros
Creates a realistic sense of depth Simple to draw



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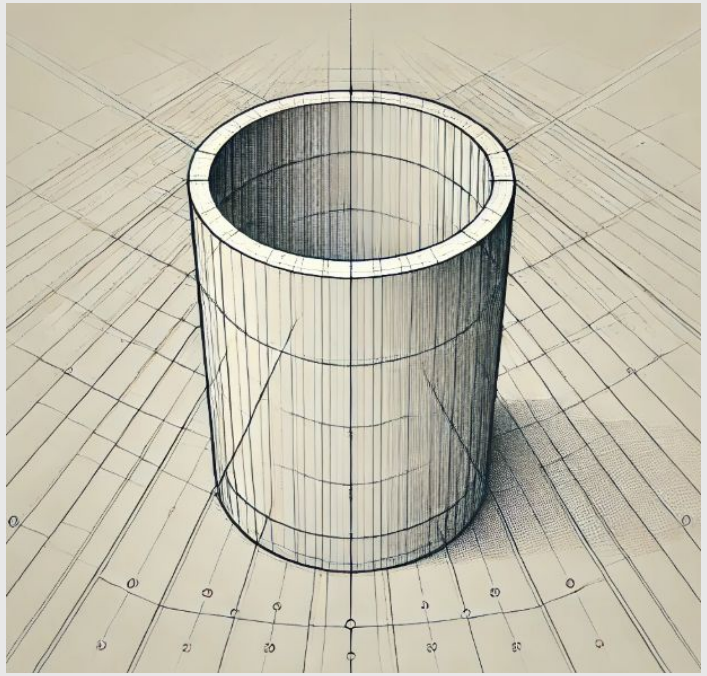

Cons
Limited to views where objects are directly facing the viewer

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One-Point Perspective

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Objects like **cylinders** and **cones** are best drawn using one-point perspective to give the 3D effect

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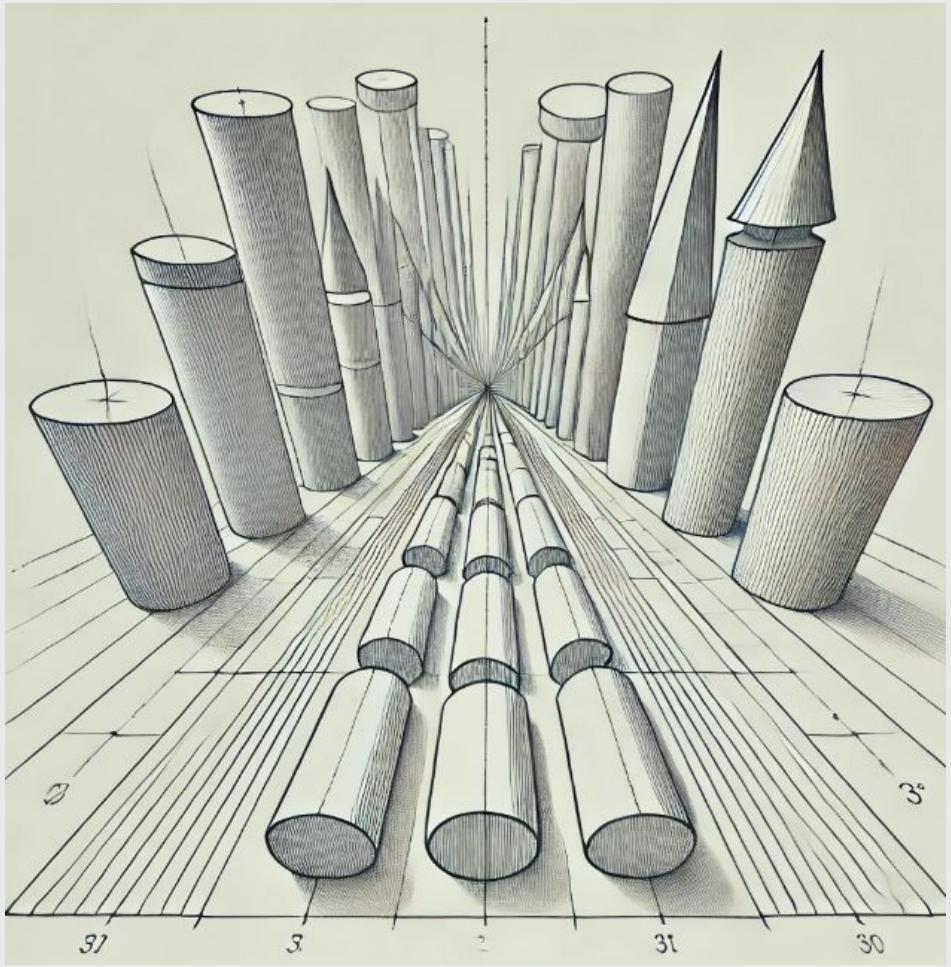

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One-Point Perspective

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How to Create a One-Point Perspective Drawing:

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4. **Define Depth** – Draw the back edges parallel to the front.
5. **Darken & Finalize** – Erase extra lines, add details, and check proportions.

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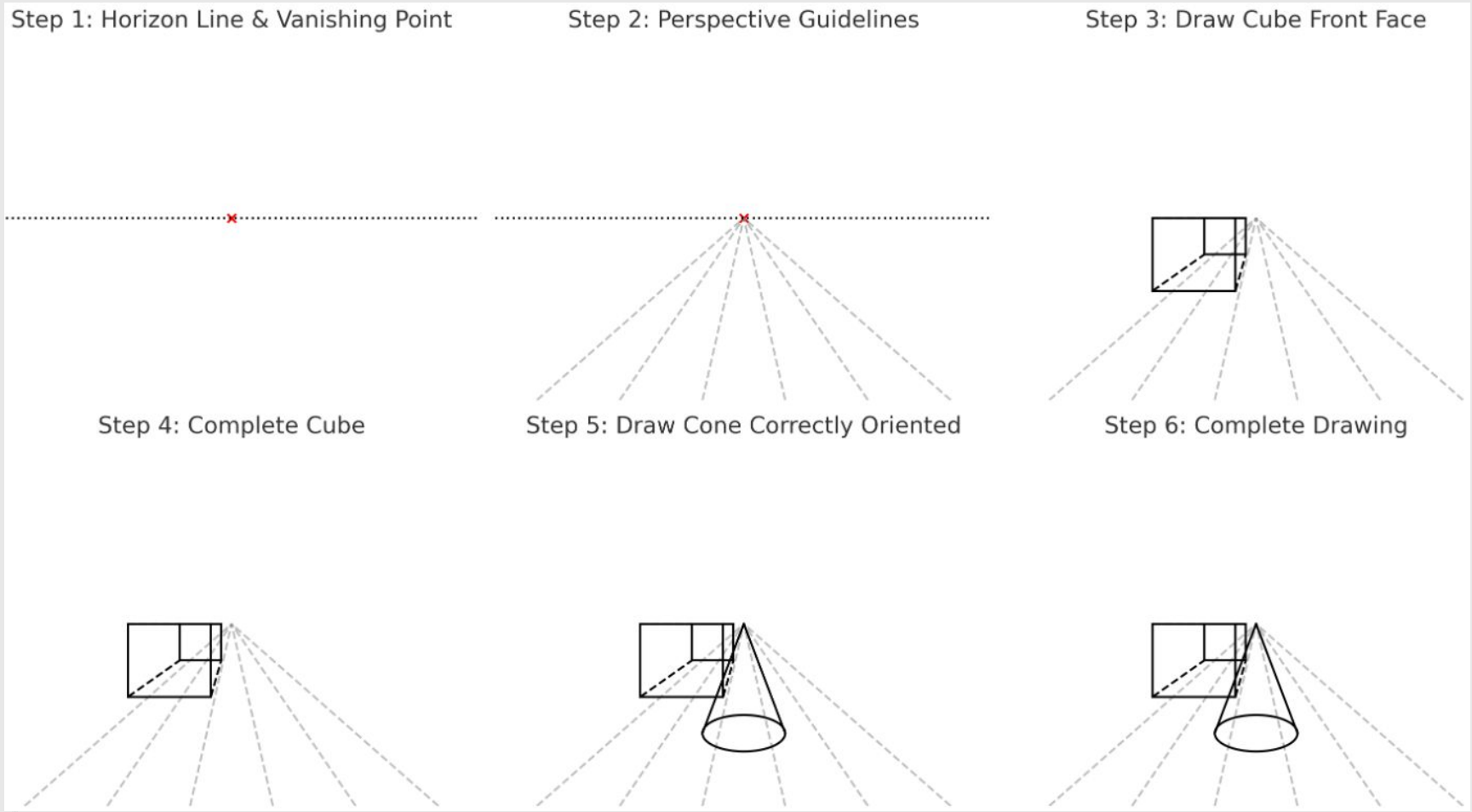

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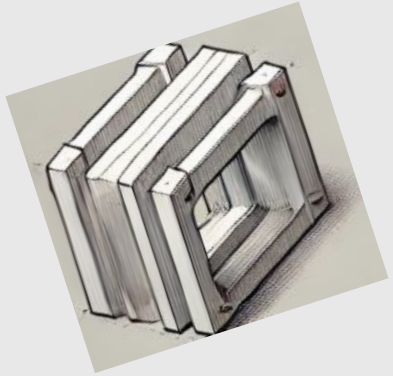
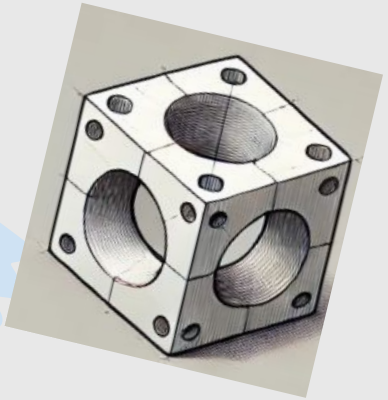
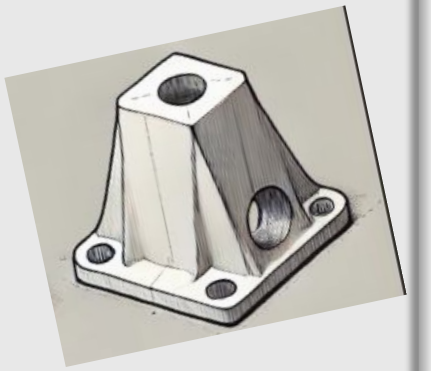




Orthographic Drawings



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Orthographic Drawings

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A type of technical drawing used by professionals to represent 3D objects through multiple 2D views. In intermediate grades, students analyze 3D objects in math and sketch design ideas in science, making orthographic drawing an essential skill.

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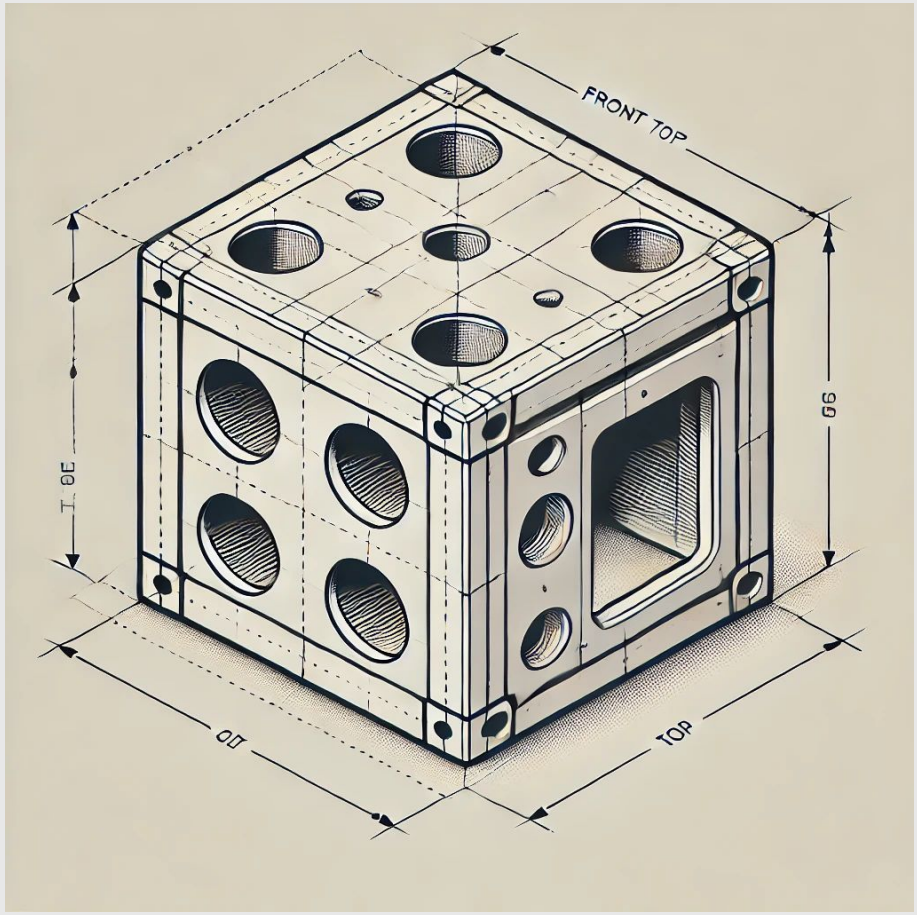

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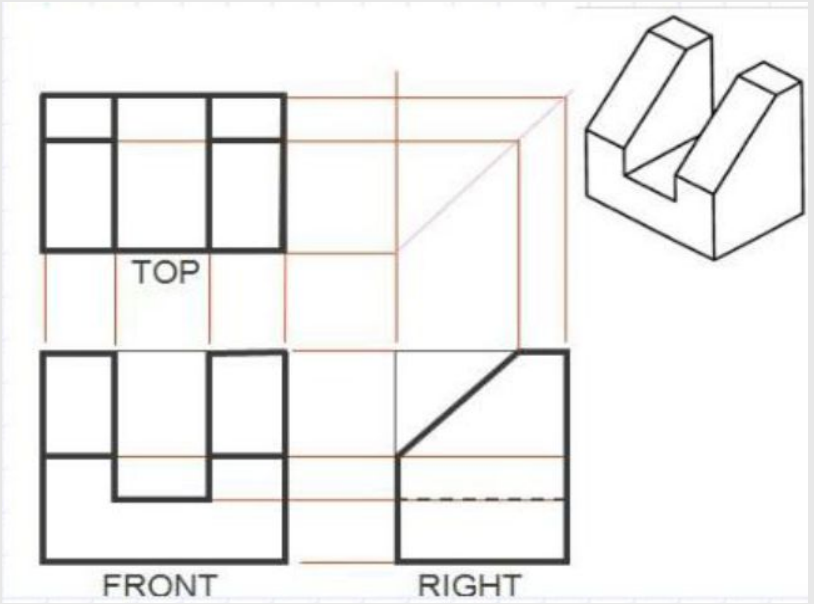

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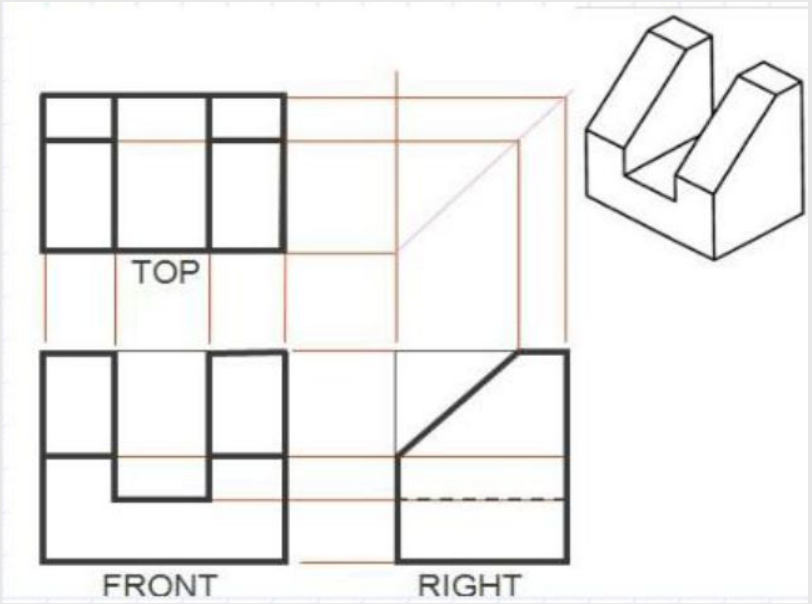

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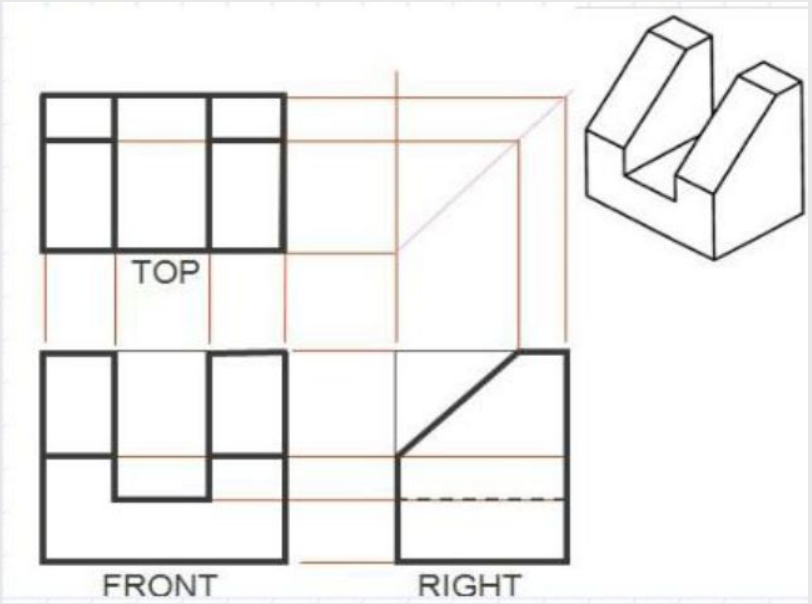

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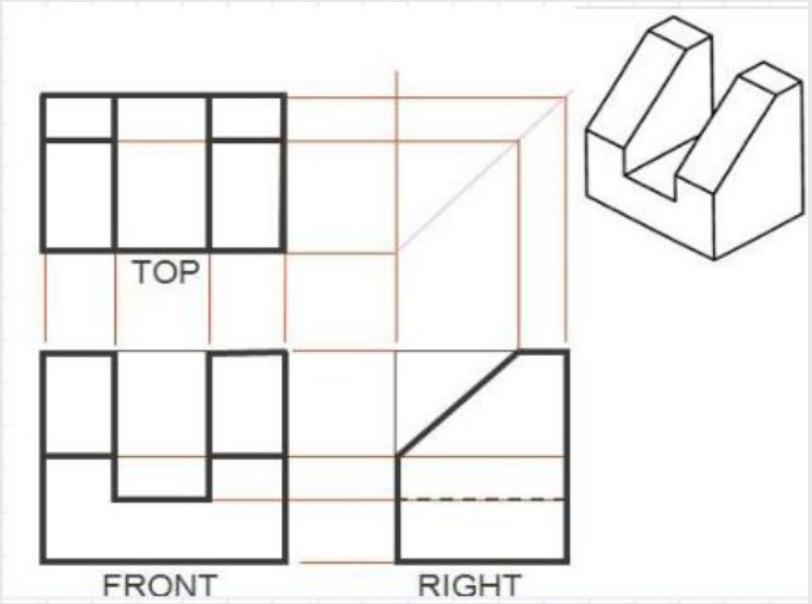

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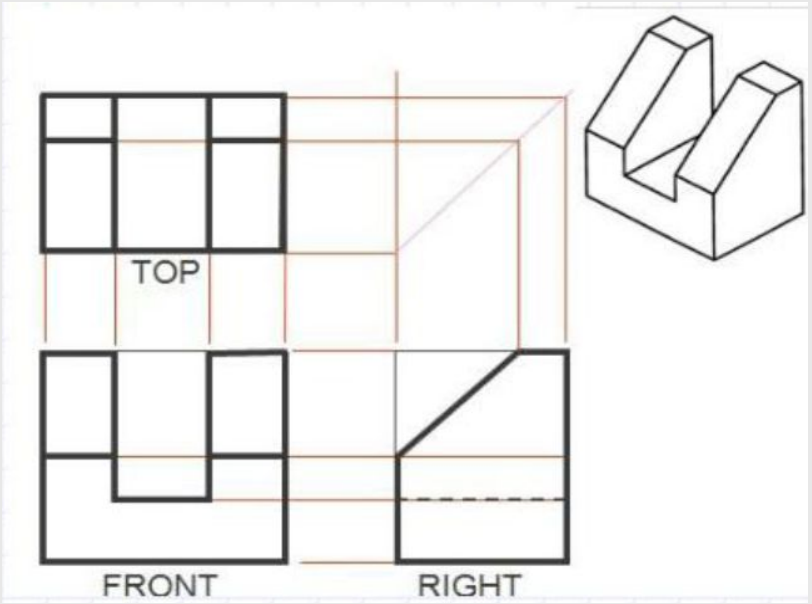

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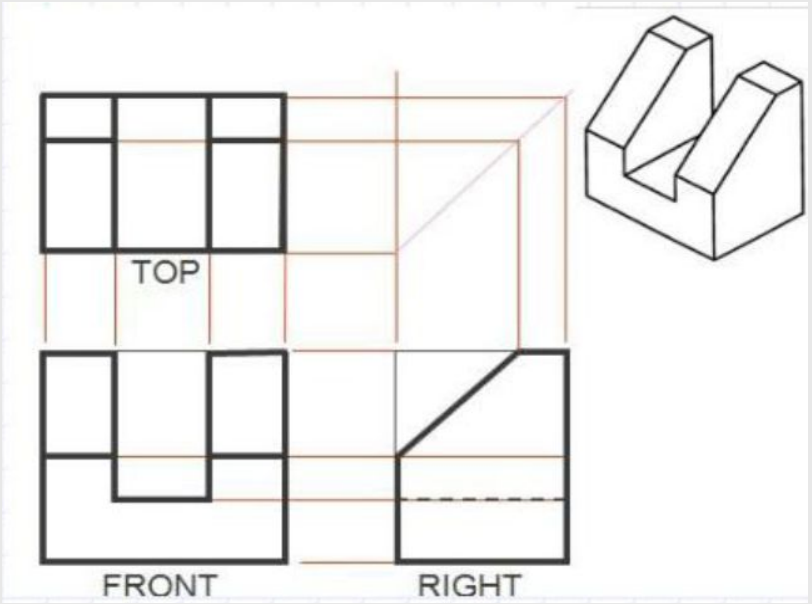

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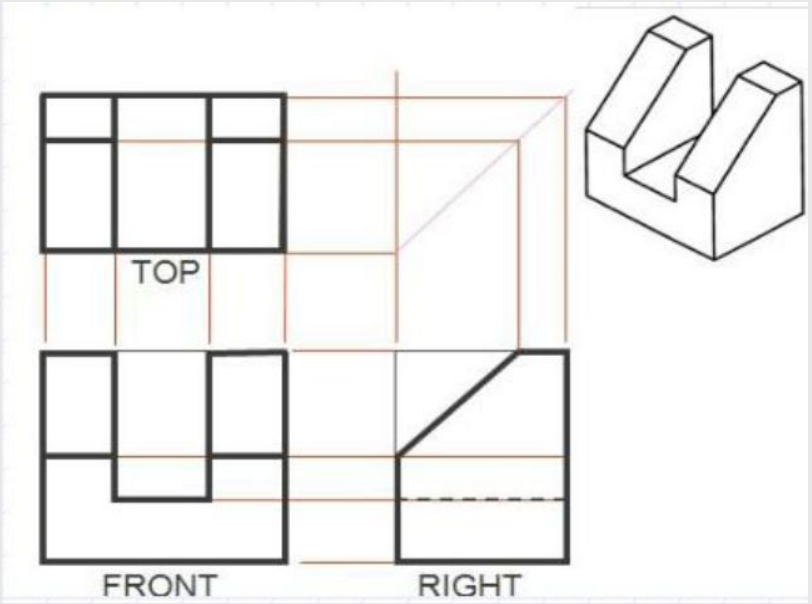

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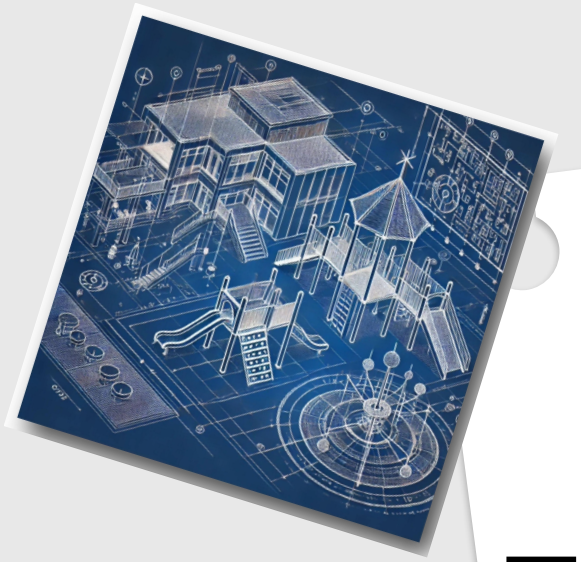

Tips for Creating Technical Drawings

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- **Line Quality Matters** – Use neat, appropriate thickness for borders/details.

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- **Line Quality Matters** – Use neat, appropriate thickness for borders/details.
- **Use Hidden Lines** – Dashed lines for concealed features.

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Types of Structures

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Solid Structure

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Solid Structure

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Solid Structure

- Made from a single material or mass (e.g., dams, mountains, statues).
- Strong and heavy, designed to support loads efficiently.
- Resistant to external forces but can be costly and require more materials.

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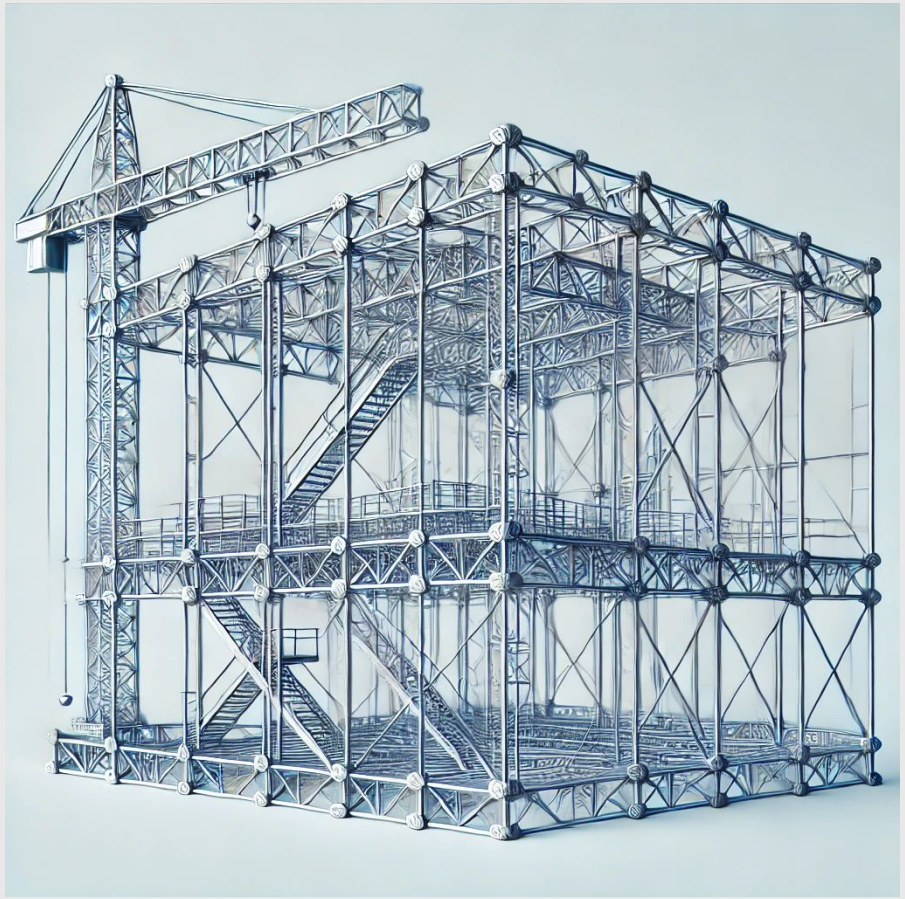
Frame Structure

Frame Structure



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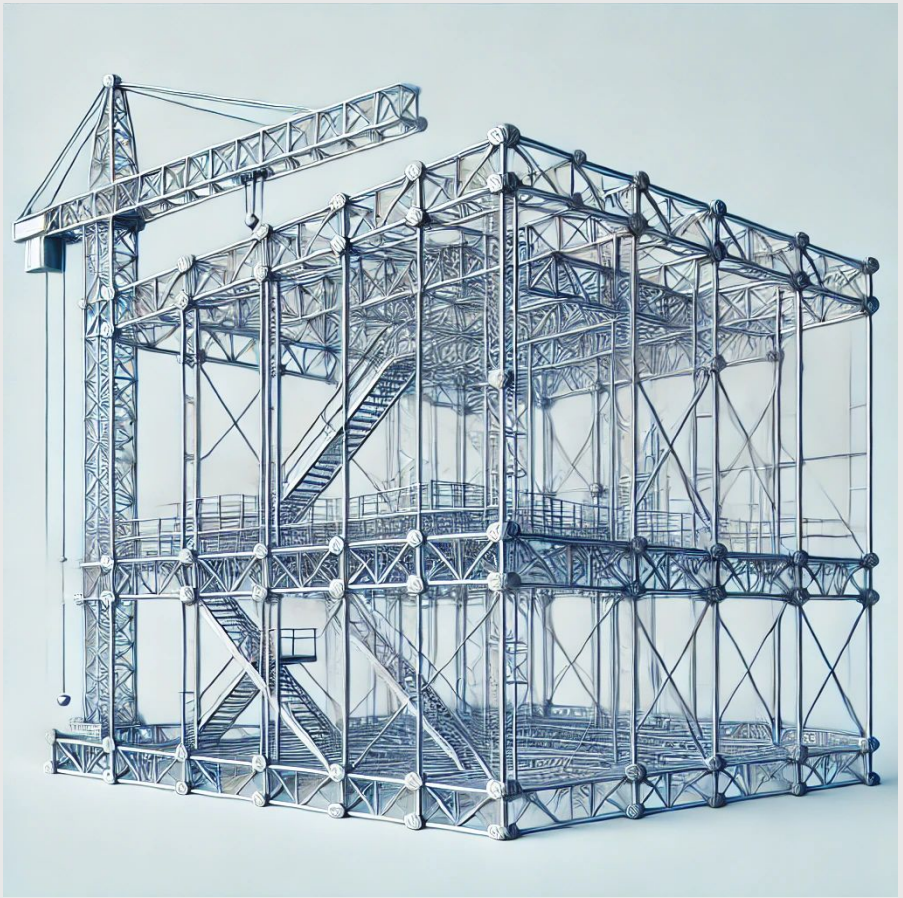
Frame Structure

- Built from a network of connected parts (e.g., bridges, skeletons, towers).
- Lightweight and flexible, using beams, columns, and joints.
- Efficient in material use but may need reinforcement for stability.



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Shell Structure

Shell Structure

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Shell Structure

- Hollow, curved outer layers enclosing a space (e.g., domes, eggshells, car bodies).
- Distributes force evenly across the surface, making them strong and lightweight.
- Can be fragile under concentrated pressure and require precise design.

Learning Goals

Learning Goals

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Learning Goals

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

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Success Criteria

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Success Criteria

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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**.

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Design Challenge - Ideal Schoolyard

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Design Challenge - Ideal Schoolyard

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Design Challenge - Ideal Schoolyard

- Design a **new item or feature** that enhances outdoor spaces for learning, play, and/or community engagement

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Design Challenge - Ideal Schoolyard

- Design a **new item or feature** that enhances outdoor spaces for learning, play, and/or community engagement
- Design must include **orthographic drawings** and a **one-point perspective** ideation sketch

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Design Challenge - Ideal Schoolyard

- Design a **new item or feature** that enhances outdoor spaces for learning, play, and/or community engagement
- Design must include **orthographic drawings** and a **one-point perspective** ideation sketch
- Design must include **at least one new element** incorporating one or two of a **solid**, **frame**, and/or **shell** structures

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Design Challenge - Ideal Schoolyard

- Design a **new item or feature** that enhances outdoor spaces for learning, play, and/or community engagement
- Design must include **orthographic drawings** and a **one-point perspective** ideation sketch
- Design must include **at least one new element** incorporating one or two of a **solid**, **frame**, and/or **shell** structures
- Creativity, innovation, and problem-solving

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The Design Challenge

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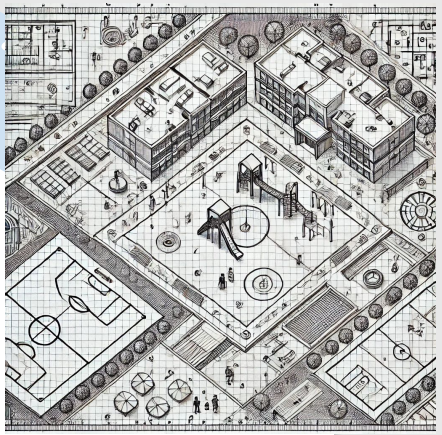
The Design Challenge



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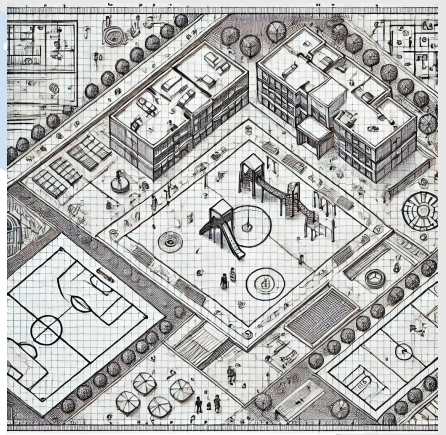
The Design Challenge

- Work individually or in a team of two



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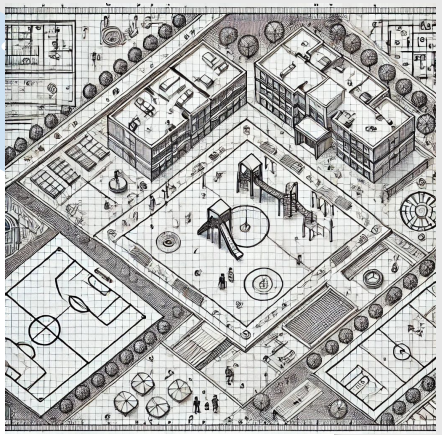

- Work individually or in a team of two
- Design an item for the school yard that meets the following criteria:

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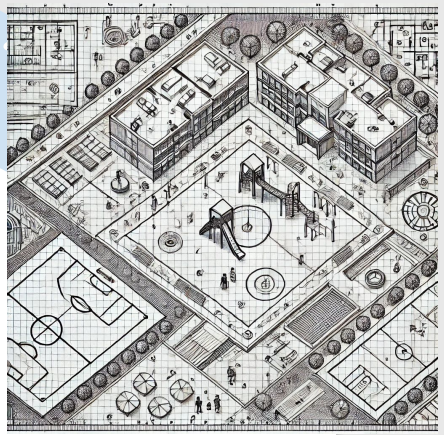
The Design Challenge



- Work individually or in a team of two
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  - Incorporates **at least one new feature or structure**

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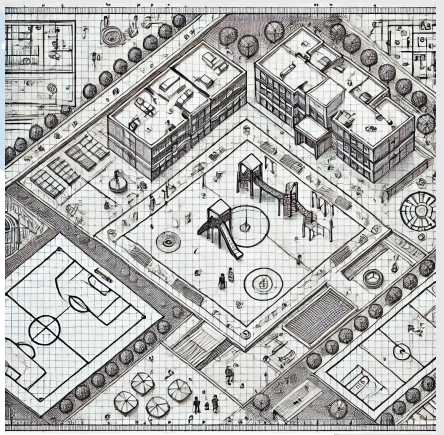

- Work individually or in a team of two
- Design an item for the school yard that meets the following criteria:
  - Incorporates **at least one new feature or structure**
  - Utilizes one of two structural types (**solid, frame, shell**)

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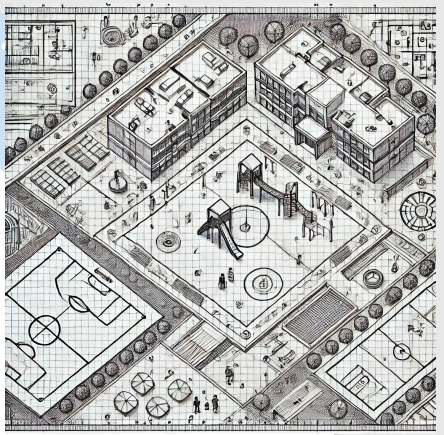
The Design Challenge



- Work individually or in a team of two
- Design an item for the school yard that meets the following criteria:
  - Incorporates **at least one new feature or structure**
  - Utilizes one of two structural types (**solid, frame, shell**)
  - Clearly demonstrates design intent through **orthographic drawings** and a **one-point perspective** sketch

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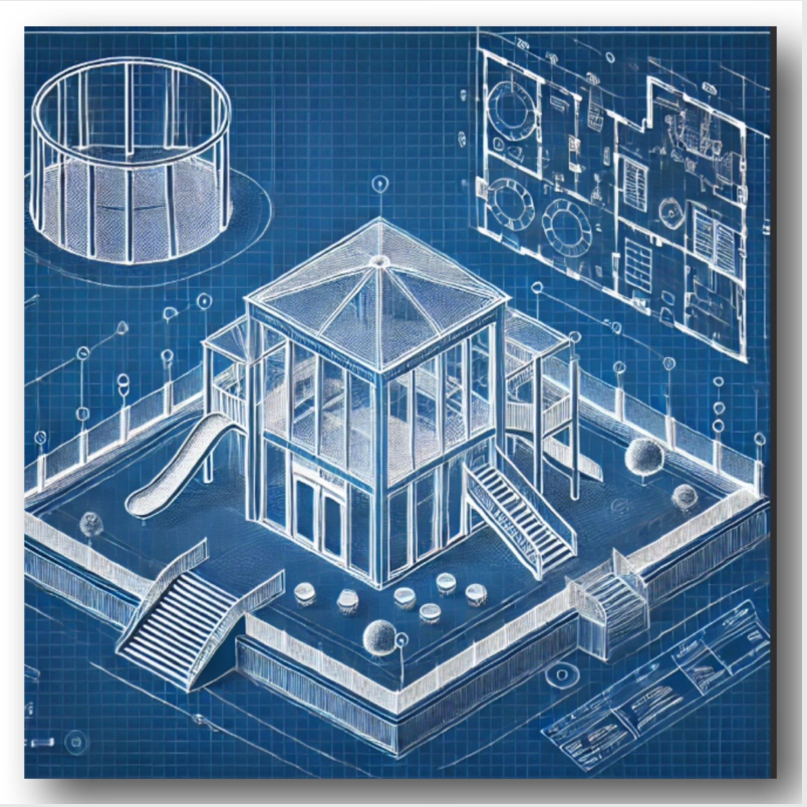
Evaluation



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Design Drawing (Orthographic & One-Point Perspective) - The orthographic drawing(s) and one-point perspective sketch(es) clearly and accurately represent the proposed school yard feature. - Drawings include clear dimensions, labeling, and proportionality, adhering to the design requirements outlined in this challenge.	**/ 25**
Creativity & Innovation: - The design reflects originality and creative problem-solving, offering a unique addition to the school year. - Demonstrates innovative use of structural types (solid, frame, shell) while maintaining practicality and user engagement.	**/ 25**
Understanding of Structural Types: - 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 school yard context.	**/ 25**
Team Reflection on Design Decisions: - 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**
Total Mark	**/100**

The Technical Planning Team

Eric Bacon (Rainbow District School Board)
Michael Frankfort (York Region District School Board)
Jason Manson (Hamilton-Wentworth District School Board)
Sarah Solter (Hamilton-Wentworth District School Board)

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