

Orthographic Projection Guide

A student reference for converting a 3D object into aligned 2D views without perspective.

Use this guide when...

- you need to communicate shape accurately without using a perspective sketch.
- you are making a multiview drawing from a part, sketch, or CAD model.
- you need to choose front, top, and right-side views that describe one object.

Projection standard used in this guide

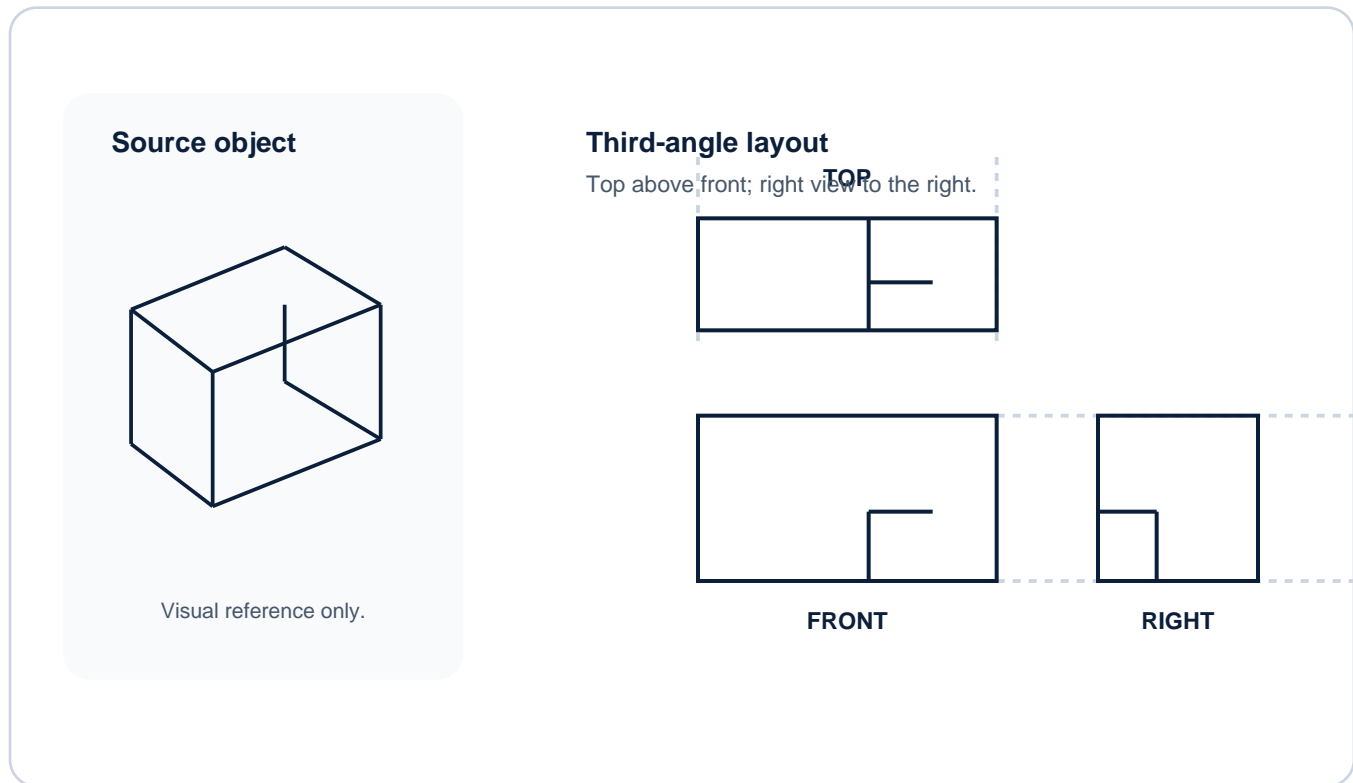
Convention	What it means	Student check
Third-angle projection	The top view is placed above the front view, and the right-side view is placed to the right of the front view.	This is the layout used throughout this guide.
Same scale across views	All orthographic views represent the same object at the same scale.	Do not stretch, shrink, or rotate one view independently.
Aligned features	Shared dimensions line up between related views.	Width aligns between top/front, height aligns between front/right, and depth aligns between top/right.
No perspective	Orthographic views show true shape on a flat plane.	Edges do not converge like they do in a perspective sketch.

Choosing the front view

- Choose the view that shows the most descriptive shape of the object.
- Choose the orientation that minimizes hidden lines when possible.
- Show the part in its normal use or assembly orientation when that helps the reader.
- Keep the longest or most stable dimension horizontal when it improves readability.
- After choosing the front view, do not rotate the top or right-side views independently.

View alignment example

The three views must stay aligned because they describe the same physical object.



Alignment rules

Views	Shared measurement	What to check
Top and front	Width	Left/right edges and feature locations align vertically.
Front and right	Height	Top/bottom edges and steps align horizontally.
Top and right	Depth	Depth is transferred between the top and side views.
All views	Scale	No view is stretched, rotated, or drawn at a different scale.

Hidden lines and centerlines

Use hidden lines and centerlines only when they improve the drawing.

Line type	Use in orthographic views	Accuracy note
Hidden line	Shows an important non-visible edge or feature.	Use sparingly. A section view may be clearer for complex internal geometry.
Centerline / center mark	Identifies holes, circular features, axes, and symmetry.	A hole should usually have a center mark or centerline in the view where it appears circular.
Projection line	Helps align views during layout.	Projection lines are construction aids; they should not look like final object lines.

Common mistakes to avoid

Mistake	Better choice
Placing the top view beside the front view.	Use the third-angle layout: top above front.
Rotating the right-side view to make it fit.	Keep the right-side view aligned with the front view.
Drawing an orthographic view with perspective edges.	Use true flat views. Parallel edges remain parallel.
Changing scale between views.	Use the same scale for all related views.
Using hidden lines for every internal edge.	Use hidden lines only when helpful; consider a section view for complex interiors.

Quality checklist

- The front view shows the most descriptive shape of the object.
- The top view is directly above the front view.
- The right-side view is directly to the right of the front view.
- Width, height, and depth align across related views.
- All views use the same scale and orientation.
- Hidden lines and centerlines are used only where they clarify the drawing.