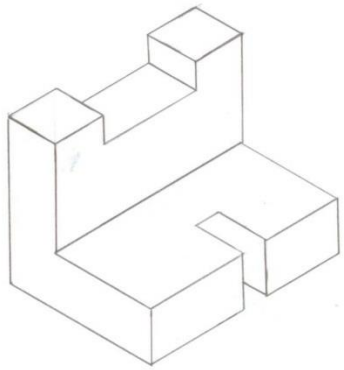
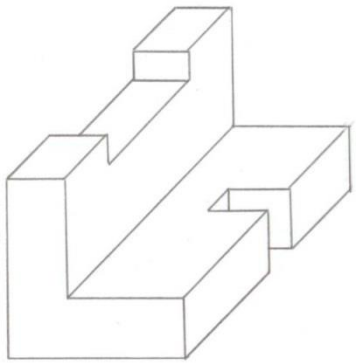
Isometric and Oblique Pictorials

Pictorial Drawing

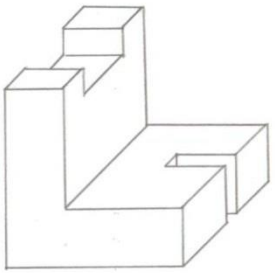
- 2D illustration of a 3D object
- Shows three faces of an object in one view
- Provides a realistic view of an object
- Three types
  - Isometric
  - Oblique
  - Perspective



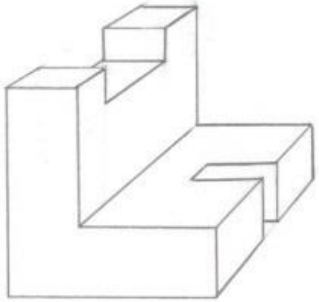
Isometric



Oblique (Cavalier)



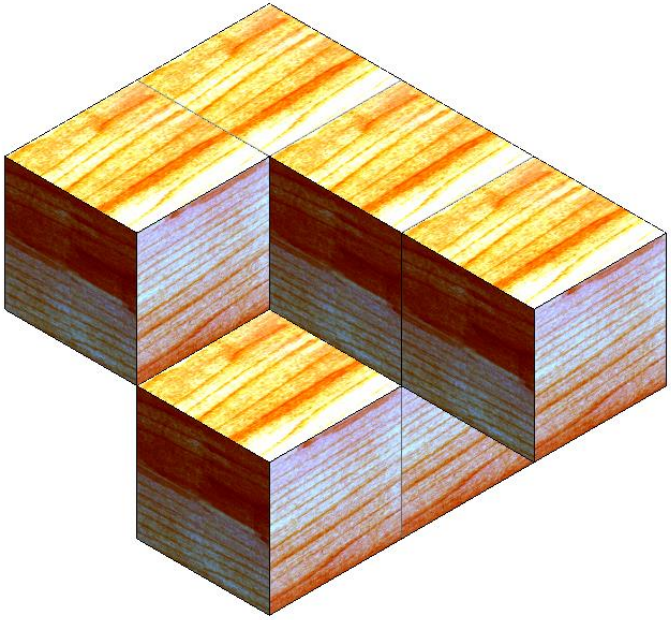
Oblique (Cabinet)

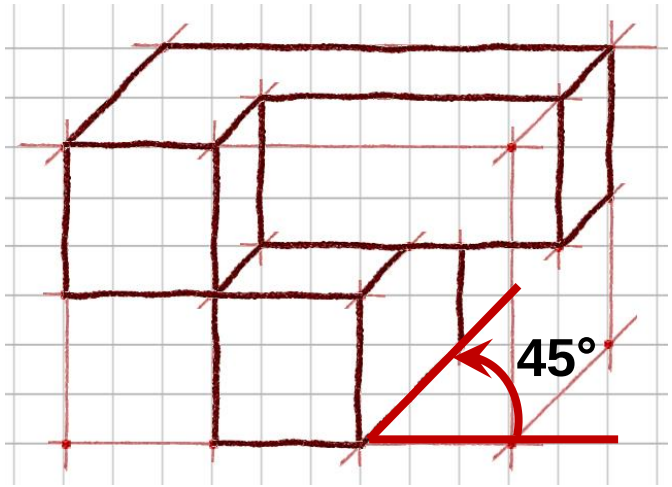


Perspective

Oblique Pictorials

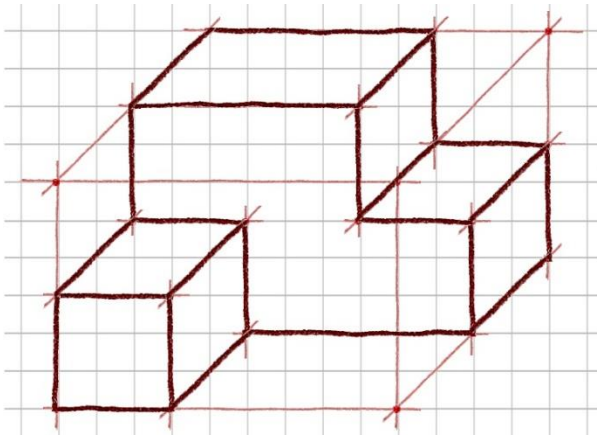
- An *oblique pictorial* starts with a straight-on view of one of the object's faces, which is often the front face.
- Angled, parallel lines are drawn to one side to represent the object's depth. Common oblique angles include 30°, 45°, and 60°.



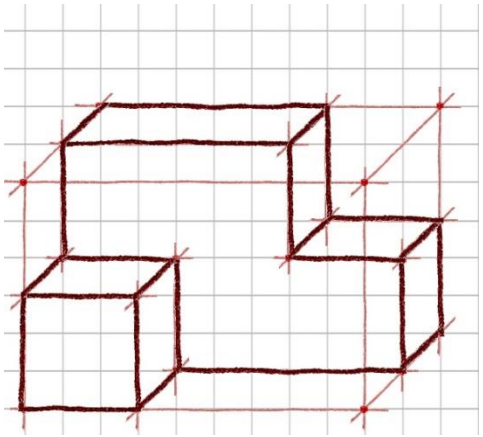


Oblique Pictorials

- Two common types of *oblique pictorials*:
  - Cavalier
  - Cabinet
- The difference between the two is how the *depth* of the object is represented



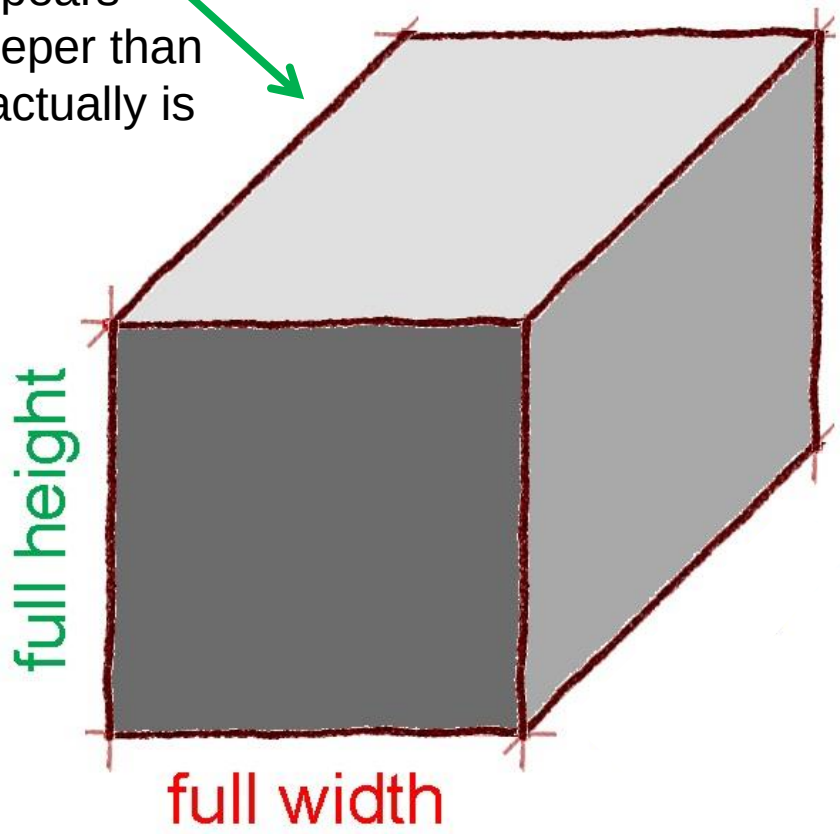
Cavalier Oblique



Cabinet Oblique

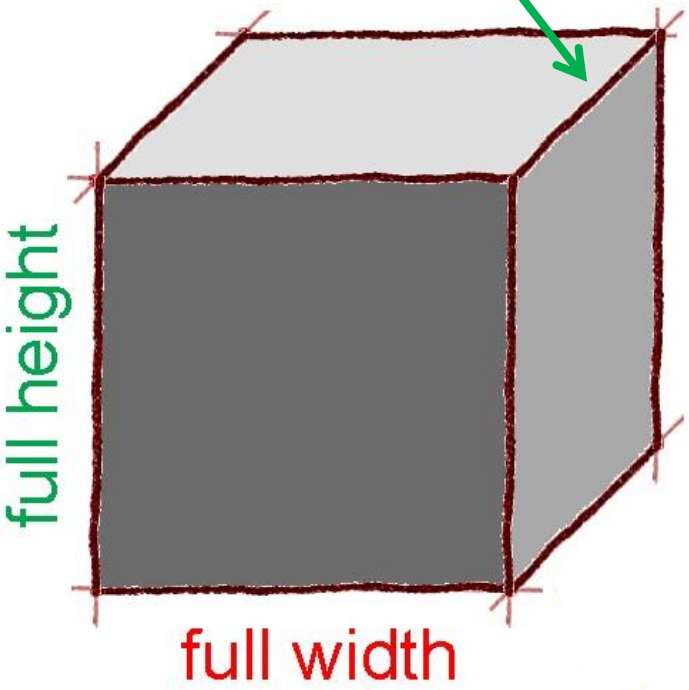
Oblique Pictorials

Object appears deeper than it actually is



Cavalier Oblique

More realistic view because depth does not appear distorted

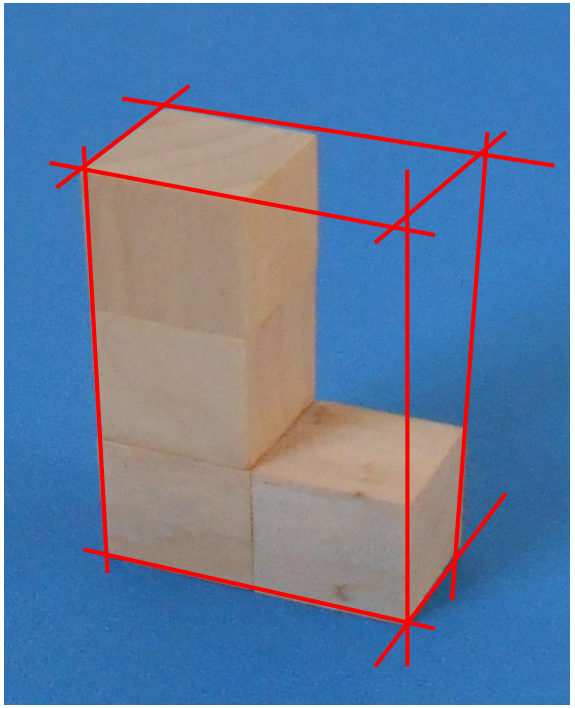


Cabinet Oblique

Oblique Pictorials

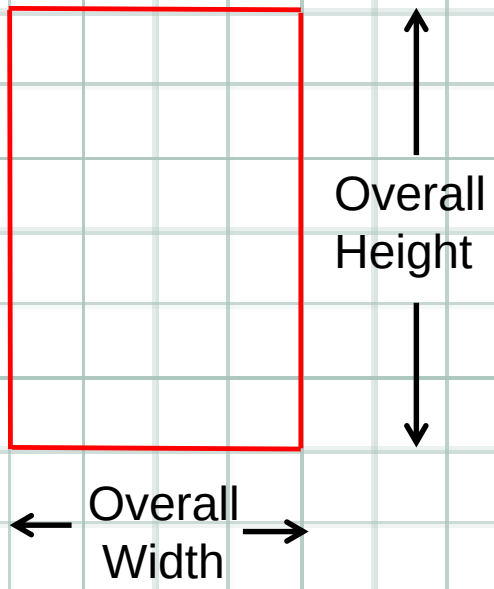
The following slides show the steps in creating oblique pictorials of the puzzle piece shown below.

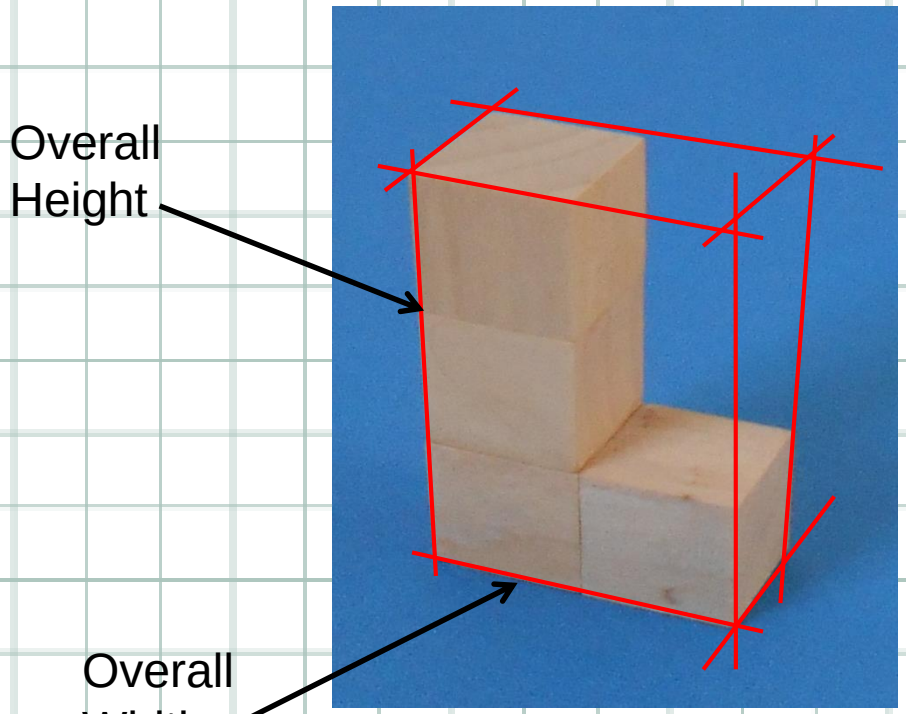
Imagine a glass box that encloses the entire object.



Oblique Pictorials

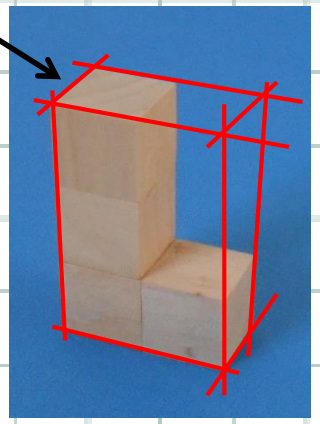
1. Sketch a rectangle to represent the overall height and width of “the box” such that height lines are vertical and width lines are horizontal. This will give a straight-on view of the front of the object.





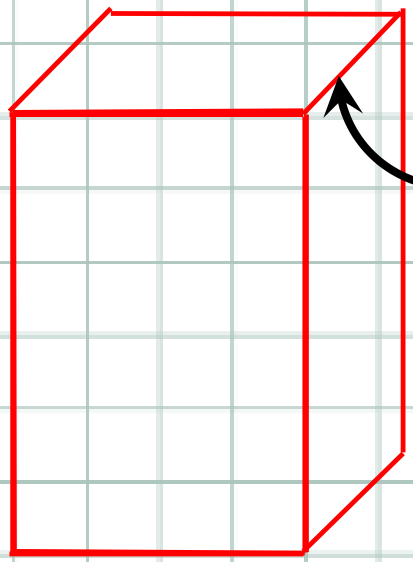
Oblique Pictorials

Overall Depth

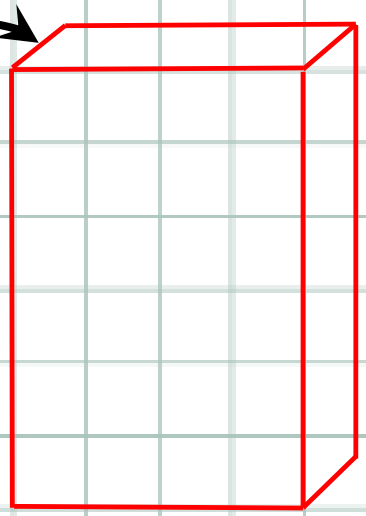


2. Complete “the box” by sketching depth lines to the overall depth of the object at a given angle (45 degrees here).

Cabinet is drawn half depth



Cavalier is drawn full depth

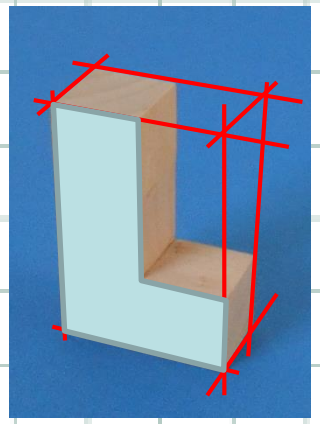


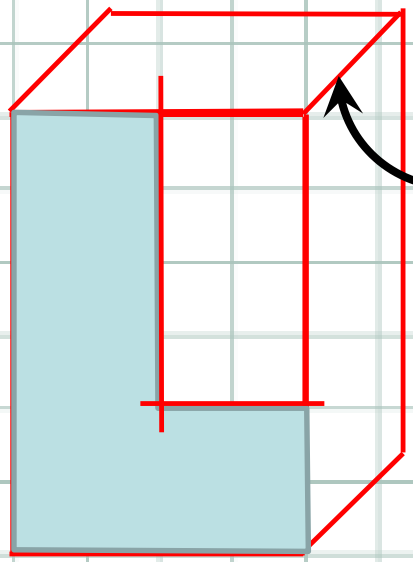
Cavalier Oblique

Cabinet Oblique

Oblique Pictorials

3. Sketch points and construction lines to identify the edges of the object faces that occur on the visible surfaces of “the box.”

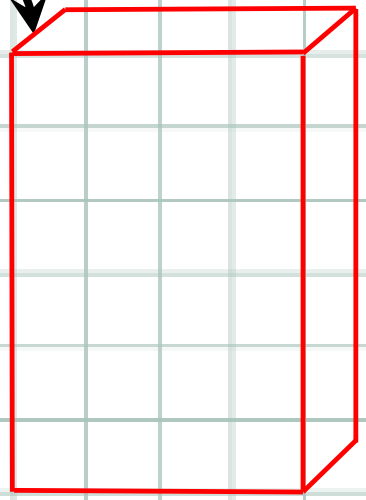




Cavalier is full depth

Cavalier Oblique

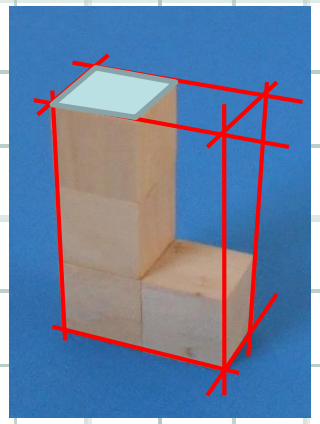
Cabinet is half depth

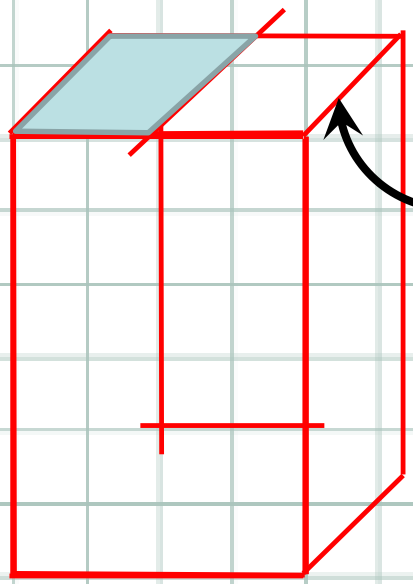


Cabinet Oblique

Oblique Pictorials

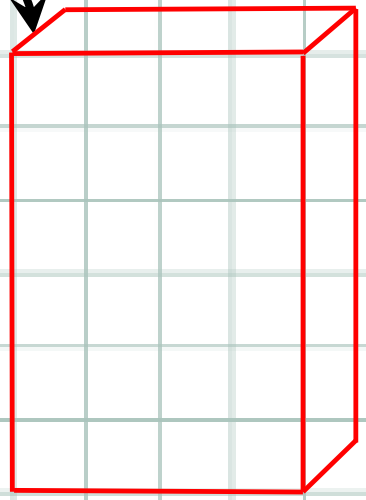
3. Sketch points and construction lines to identify the edges of the object faces that occur on the visible surfaces of “the box.”





Cavalier is full depth

Cabinet is half depth

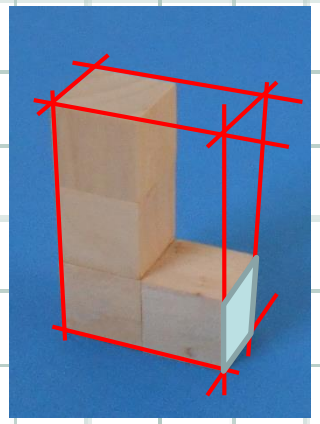


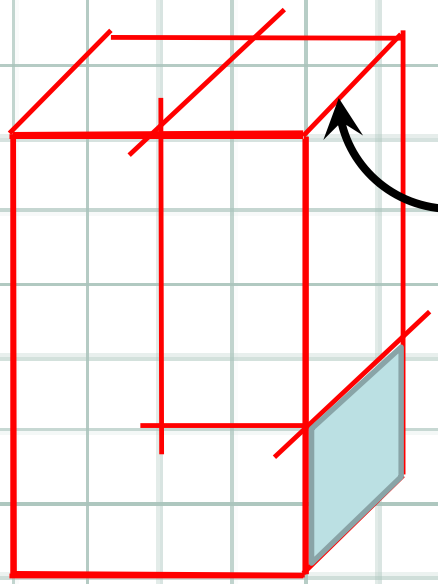
Cavalier Oblique

Cabinet Oblique

Oblique Pictorials

3. Sketch points and construction lines to identify the edges of the object faces that occur on the visible surfaces of “the box.”

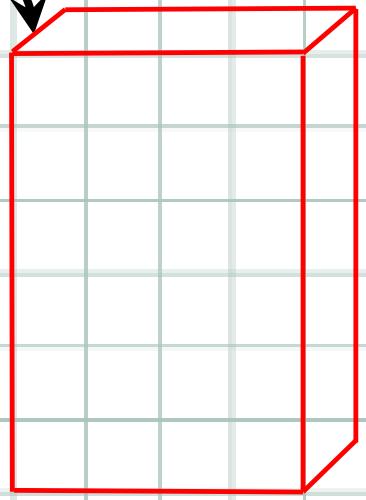




Cavalier is full depth

Cavalier Oblique

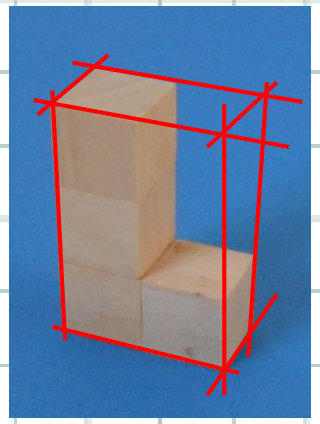
Cabinet is half depth

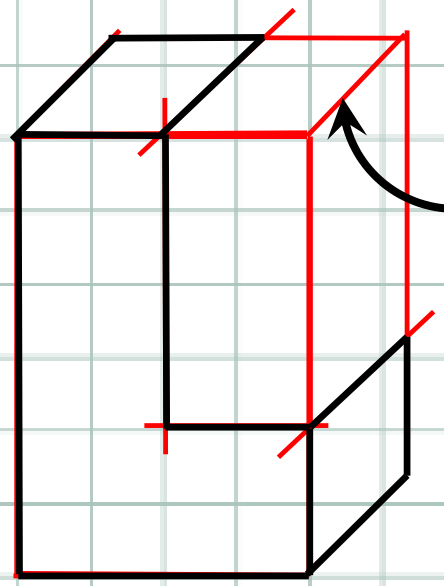


Cabinet Oblique

Oblique Pictorials

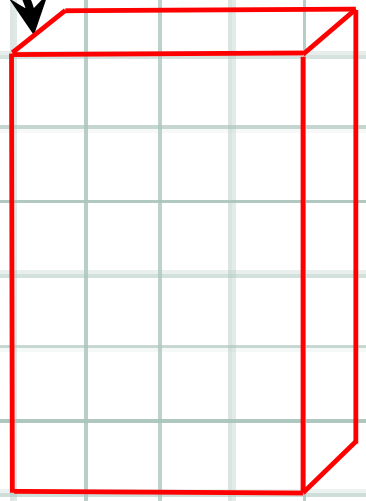
4. Use object lines to trace over the construction lines to delineate the edges of the object faces that occur on the visible surfaces of “the box.”





Cavalier is full depth

Cabinet is half depth

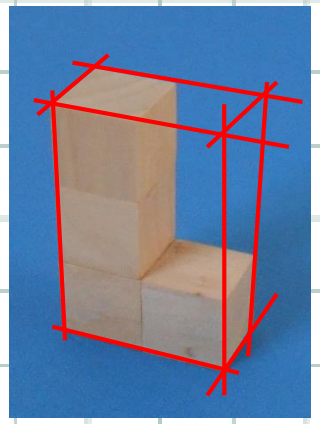


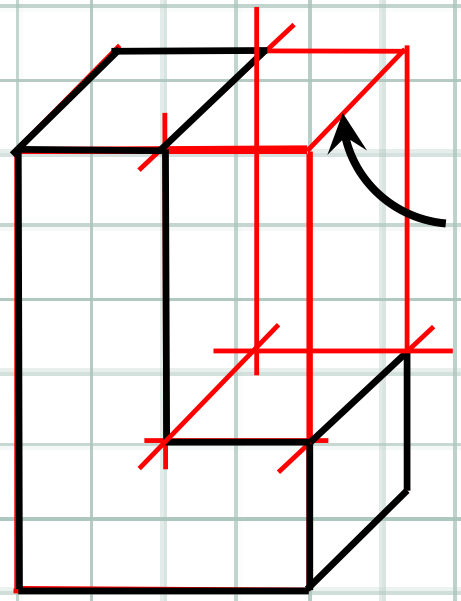
Cavalier Oblique

Cabinet Oblique

Oblique Pictorials

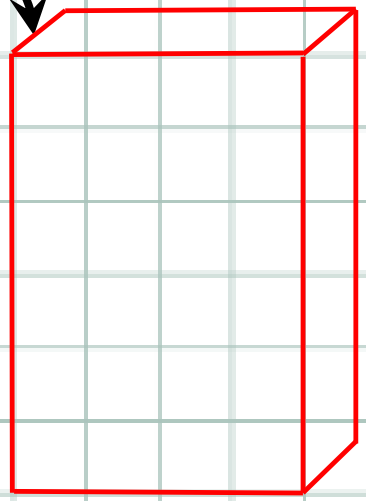
5. Sketch additional construction lines to identify edges of the object inside of the box.





Cavalier is full depth

Cabinet is half depth

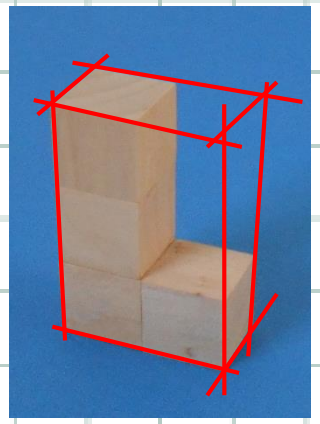


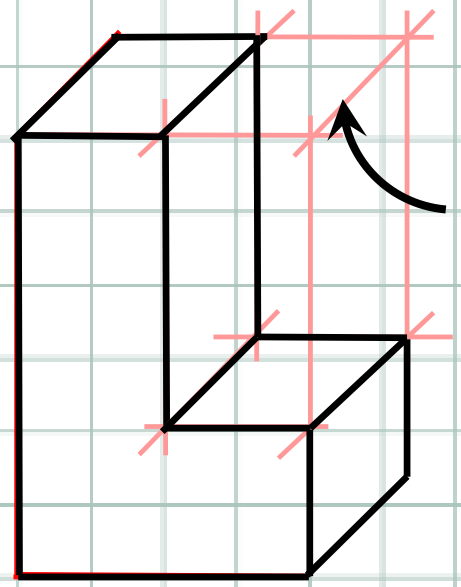
Cavalier Oblique

Cabinet Oblique

Oblique Pictorials

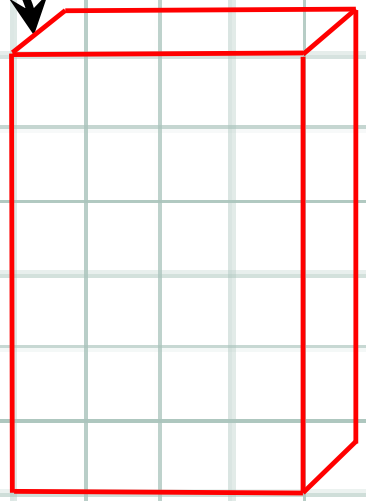
6. Trace over construction lines with object lines to delineate the remaining object lines.





Cavalier is full depth

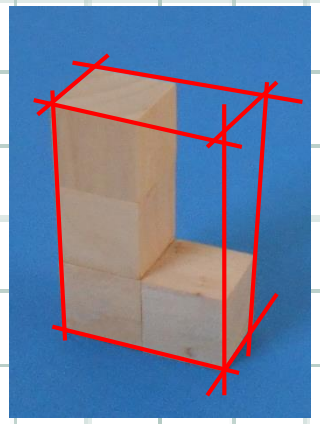
Cabinet is half depth



Cavalier Oblique

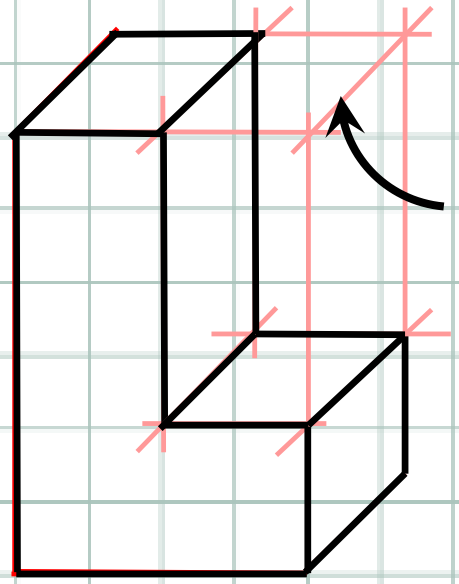
Cabinet Oblique

Oblique Pictorials

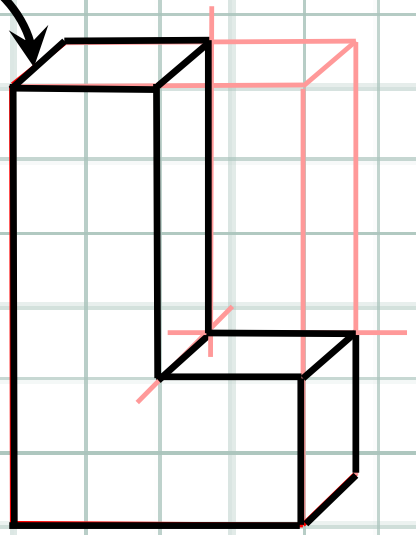


Create the Oblique Cabinet view.

Cabinet is
half depth



Cavalier is
full depth

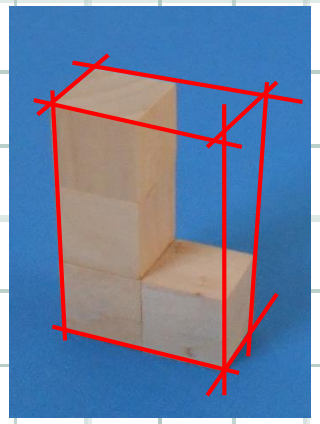


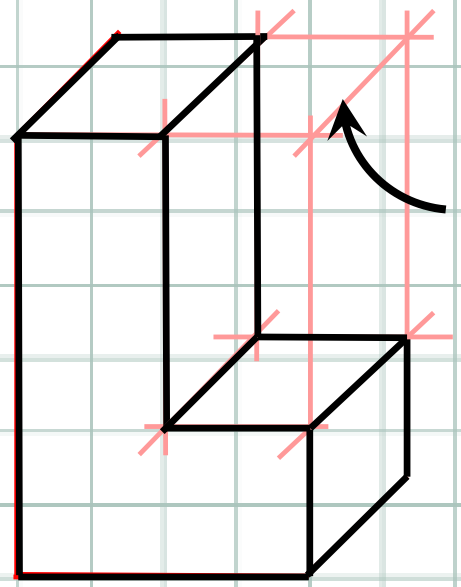
Cavalier Oblique

Cabinet Oblique

Oblique Pictorials

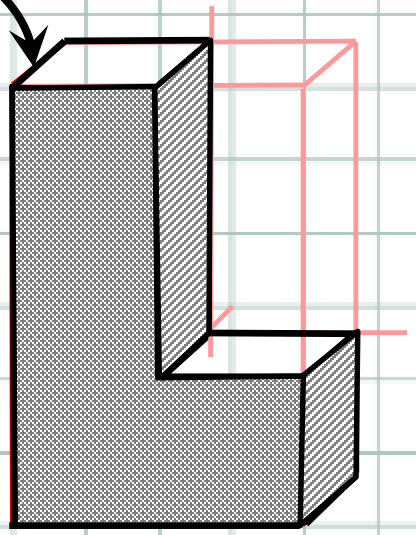
7. You may use tonal shading to enhance the appearance of the perspective sketch and create a more realistic representation.





Cavalier is full depth

Cabinet is half depth

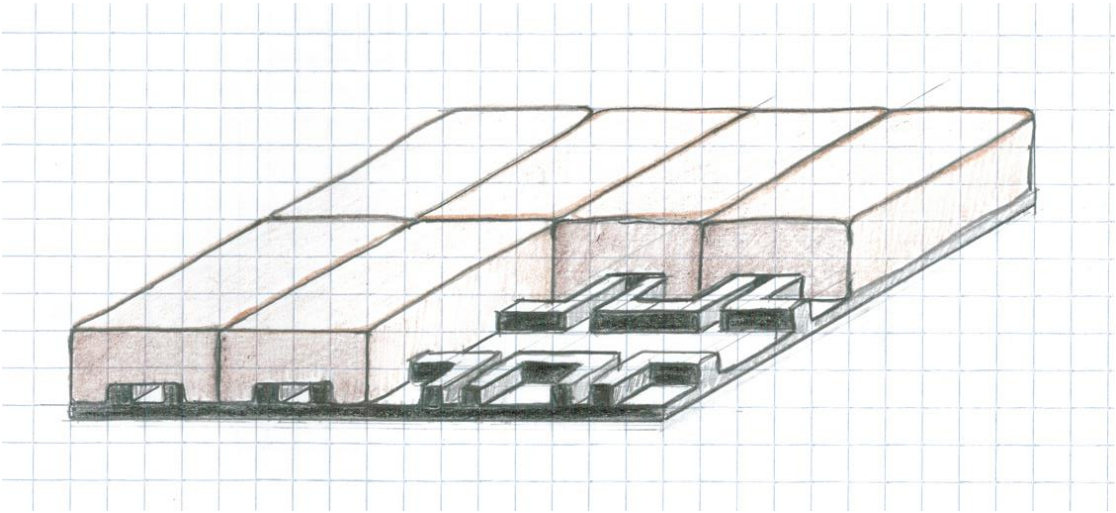


Cavalier Oblique

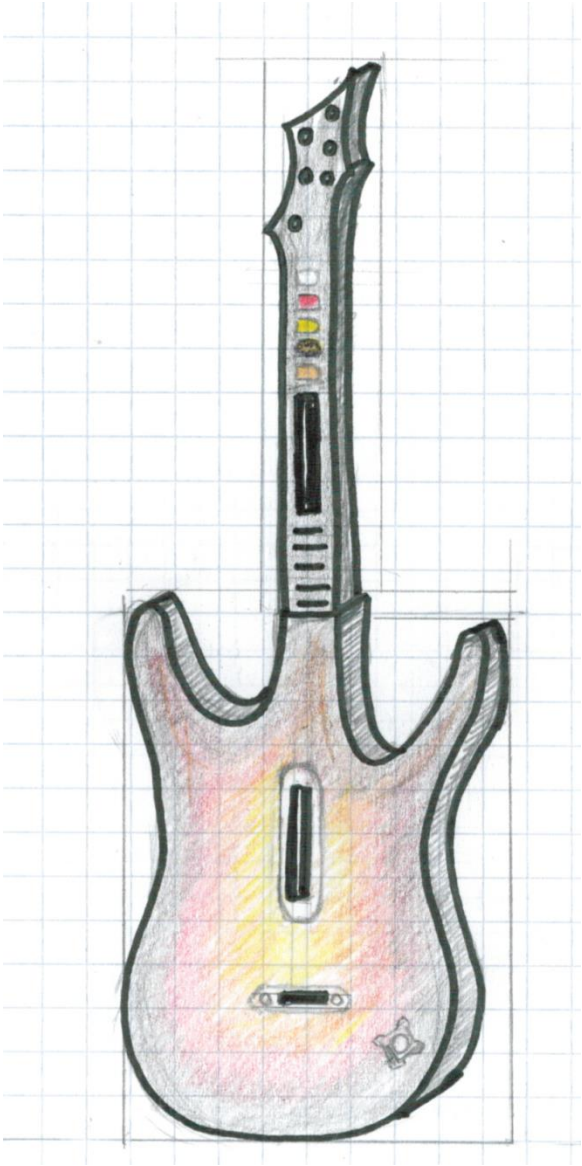
Cabinet Oblique

Oblique Pictorials

- Examples



Interlocking pavement concept

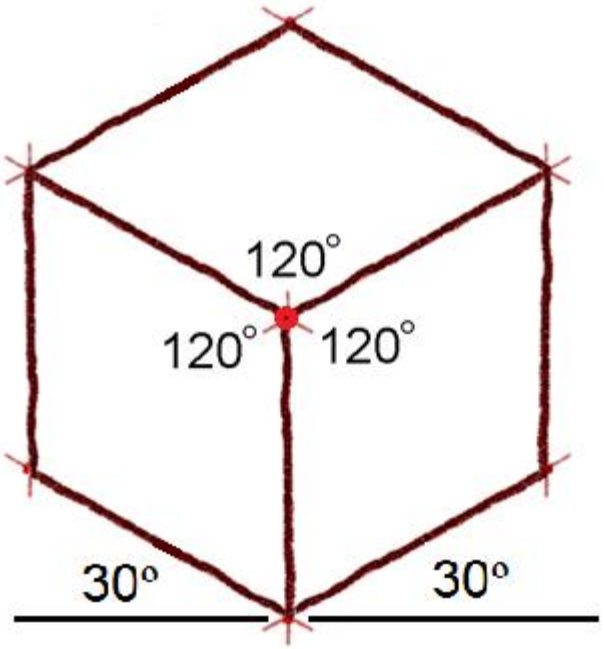


Game system controller

Isometric Pictorial

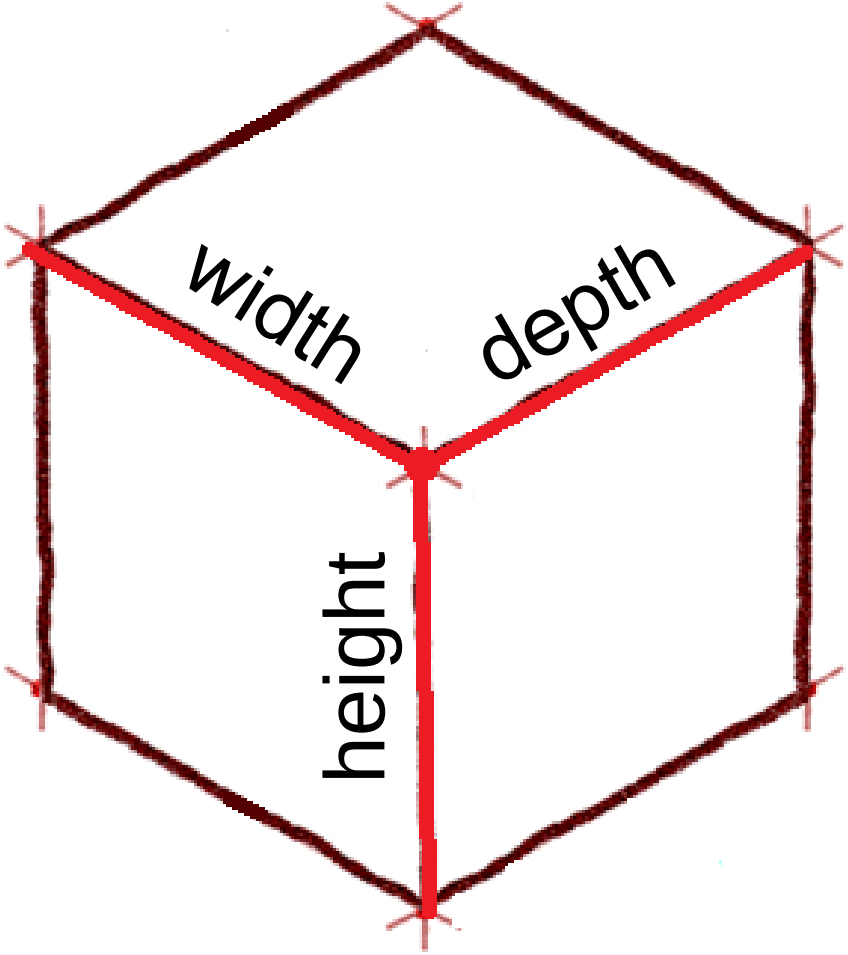
Isometric means *equal measure*.

- Three adjacent faces on a cube will share a single point
- Edges converge at one point will appear as 120 degree angles or 30 degrees from the horizon line

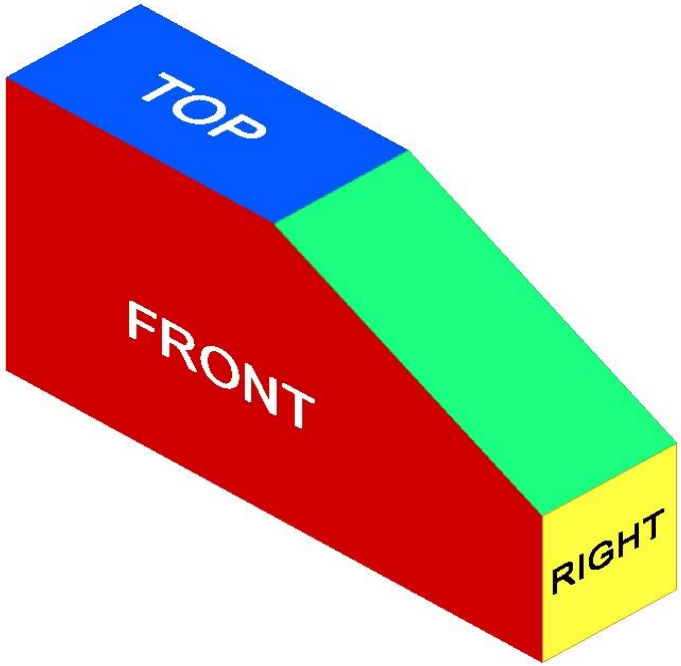


Isometric Pictorial

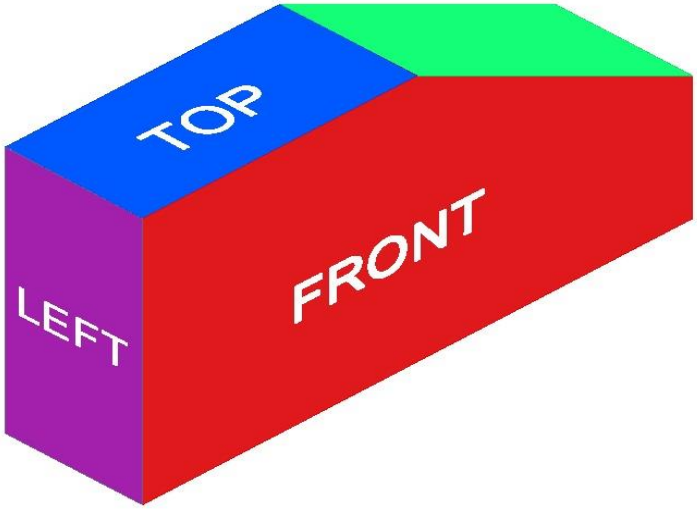
- These three edges represent height, width, and depth



View labels



Top, Front, Right-Side view orientation

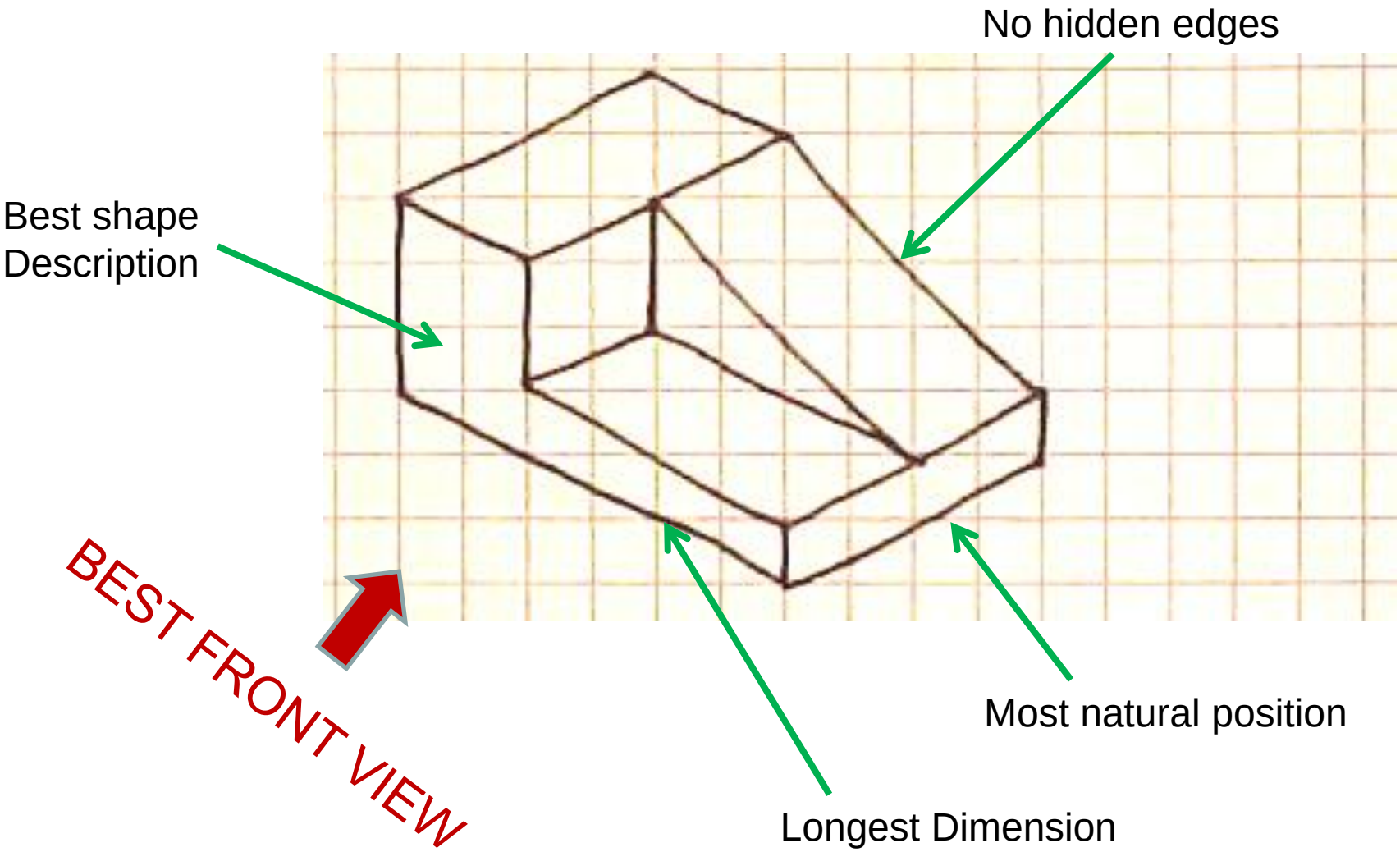


Top, Left-Side, Front, view orientation

View Selection

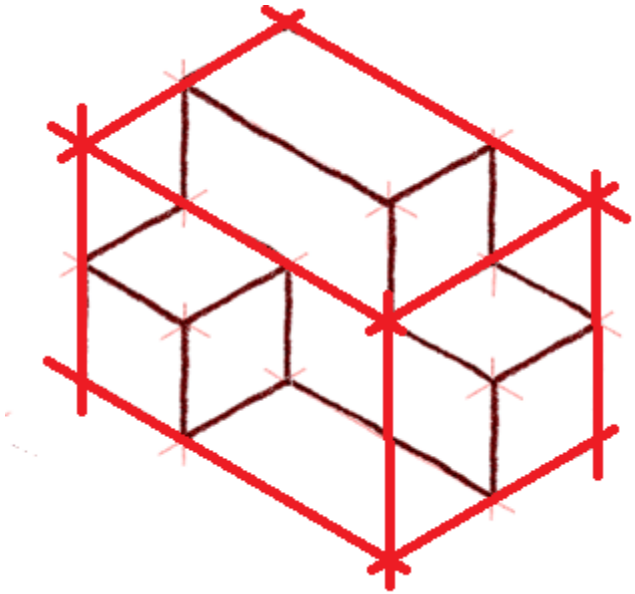
- Recommendations for how to select the front view
  - Most natural position or use
  - Shows best shape and characteristic contours
  - Longest dimensions
  - Fewest hidden lines
  - Most stable and natural position

Orthographic View Selection



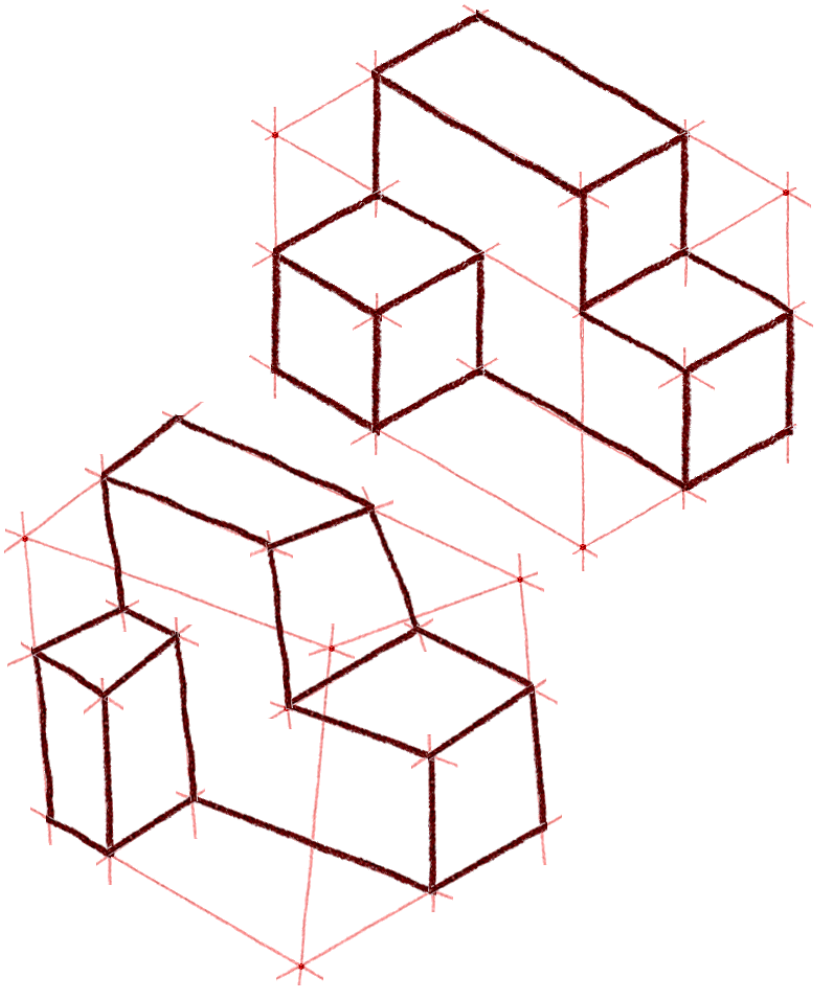
The Box Method

- The box method is a sketching technique used to maintain proportionality.
- It starts with a sketcher envisioning an object contained within an imaginary box.



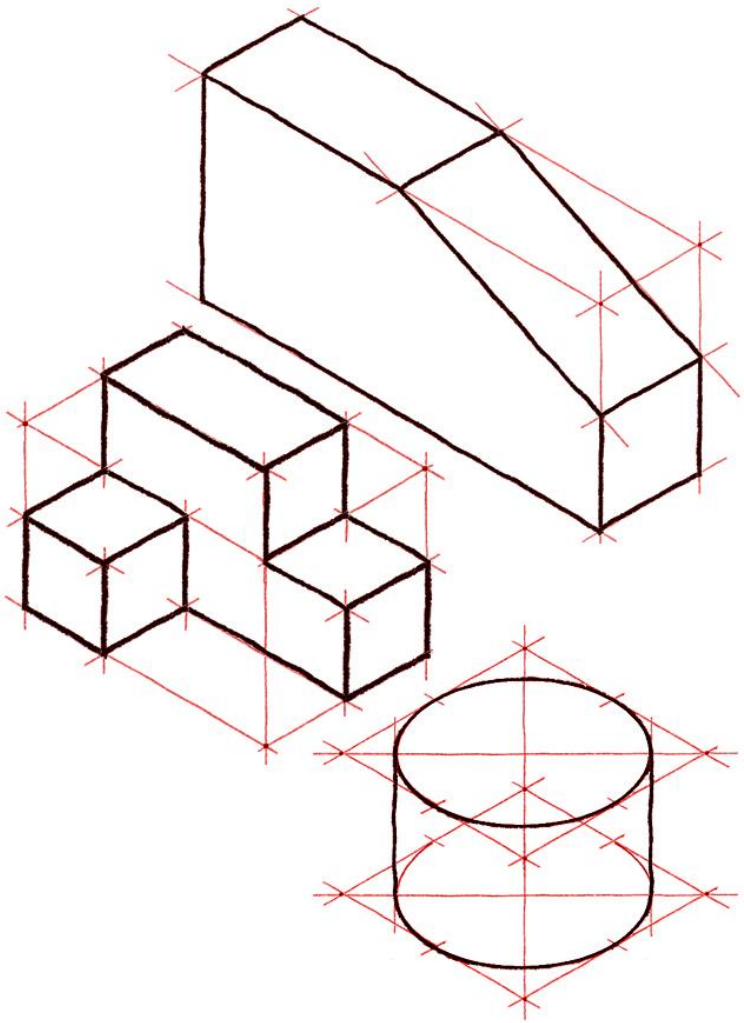
Proportion and Estimation

- Good sketching requires a sense of proportion, and the ability to estimate size, distance, angles, and other spatial relationships.



Isometric Sketching

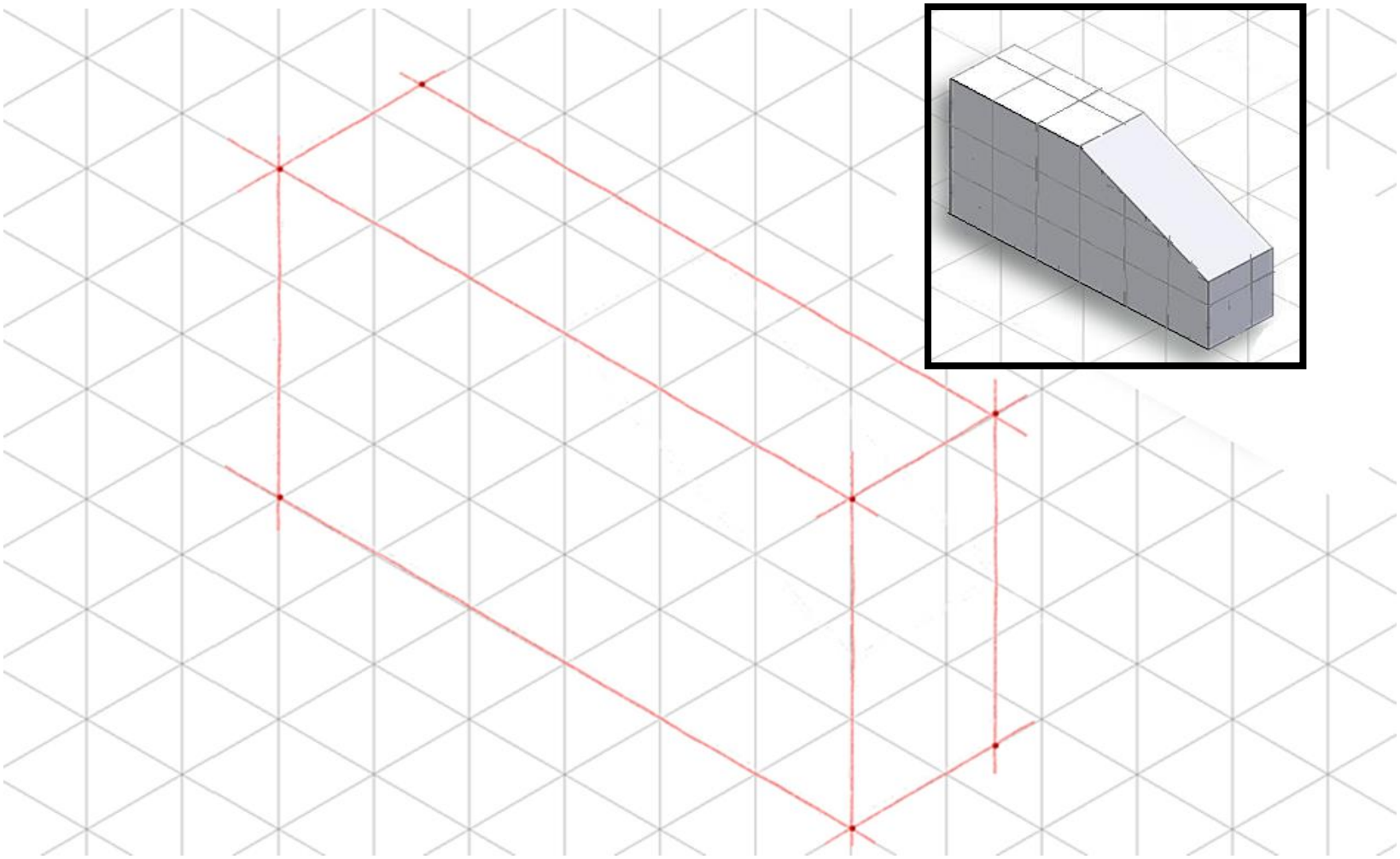
- The following examples show steps used to create isometric sketches of simple geometric objects, including tonal shading techniques.



EXAMPLE 1
Isometric Sketch

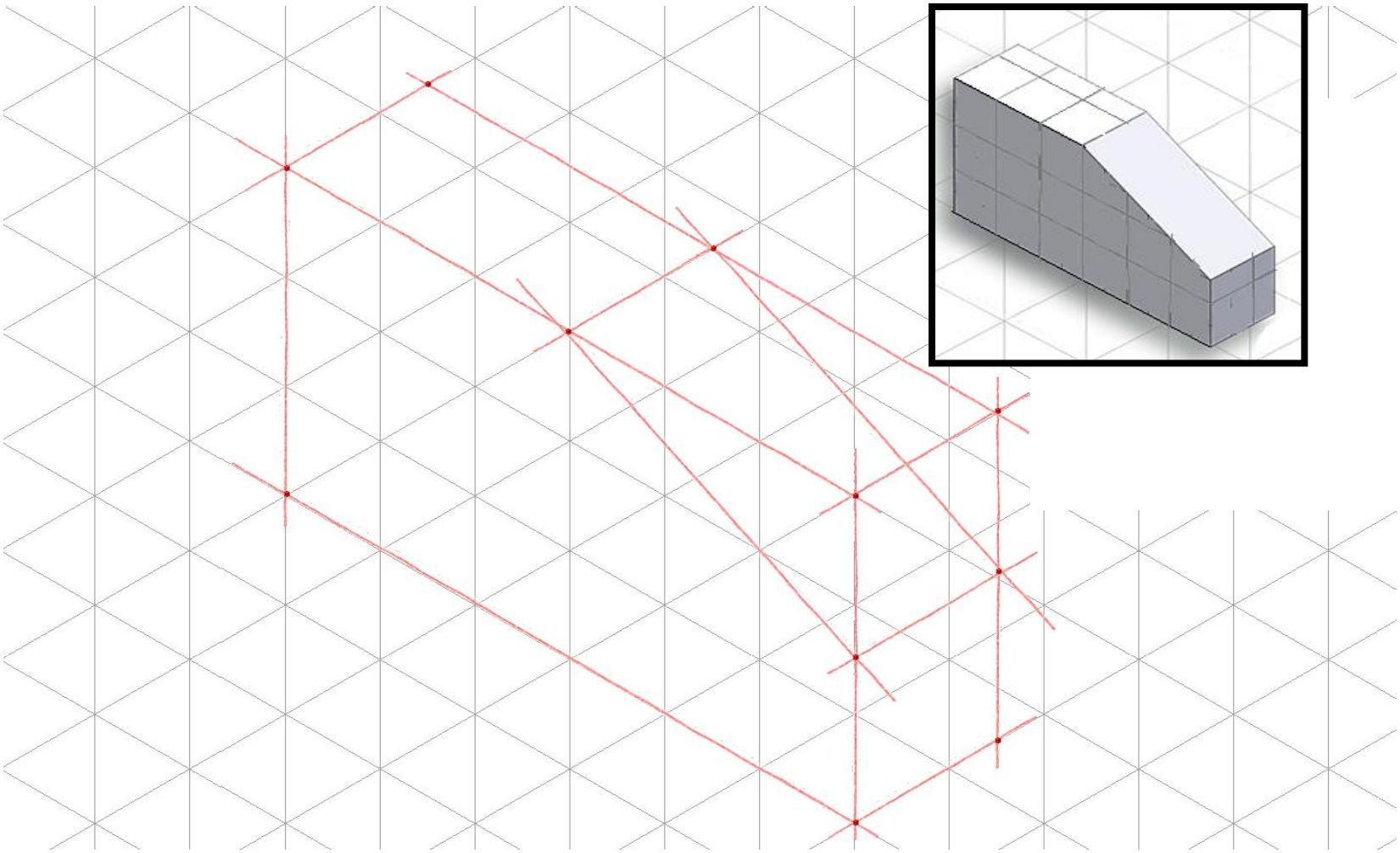
Step 1: Construct the Box

Lay out the box that will contain the isometric view using points and construction lines.



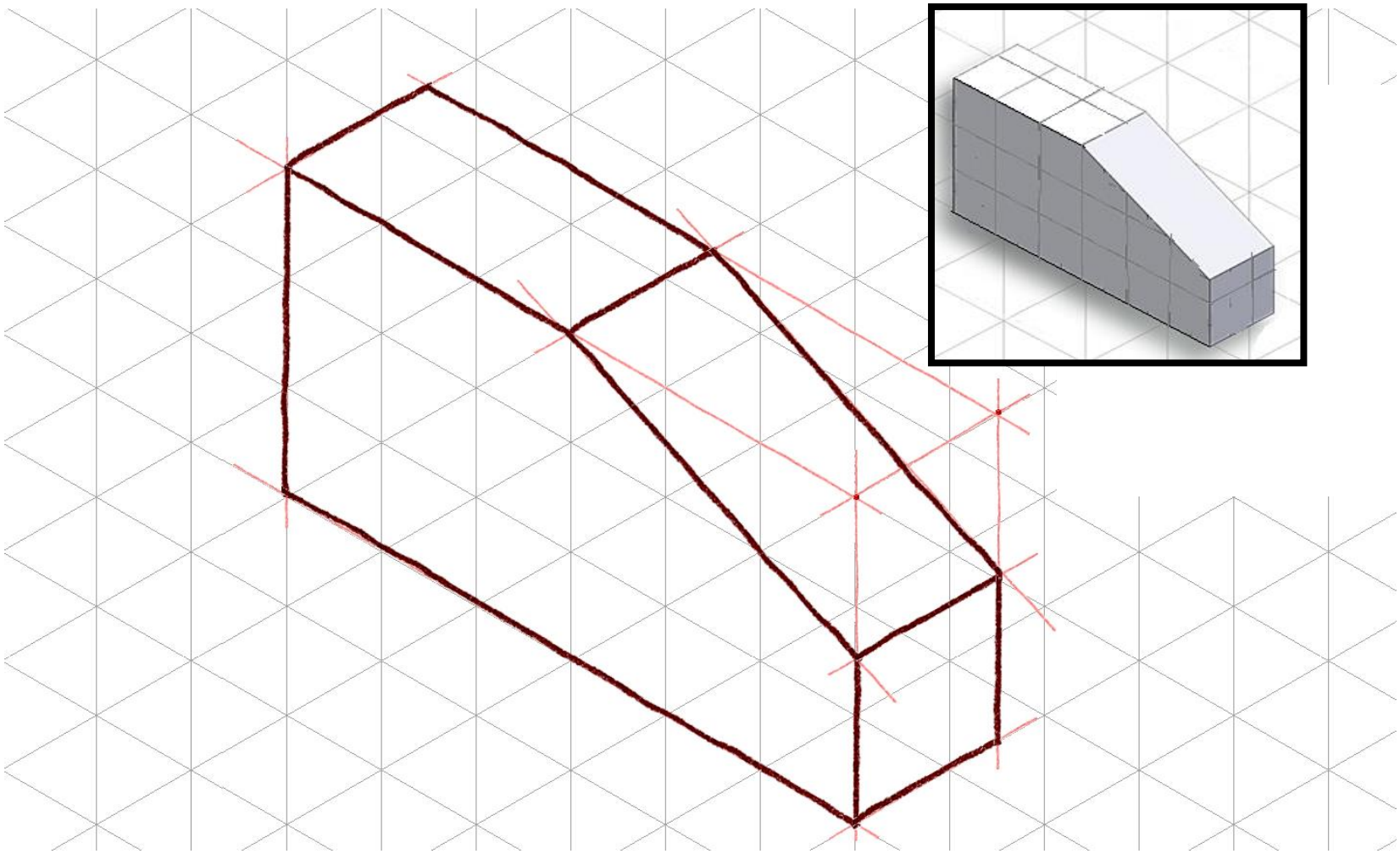
Step 2: Outside Faces

Use points and construction lines to identify corners and edges of object faces that occur on the box’s surface.



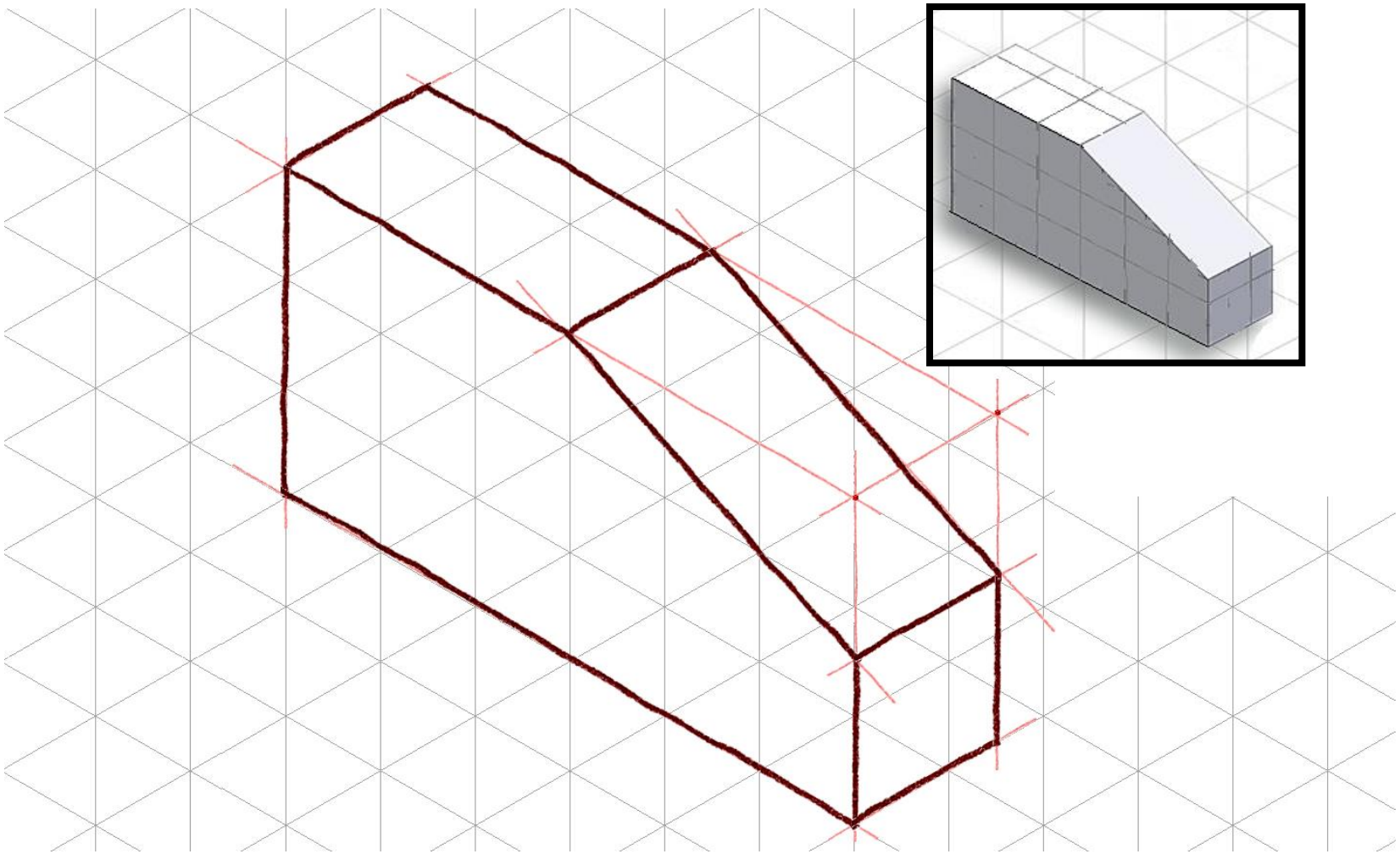
Step 2: Outside Faces (continued)

Trace visible edges of parts with thick, dark object lines.



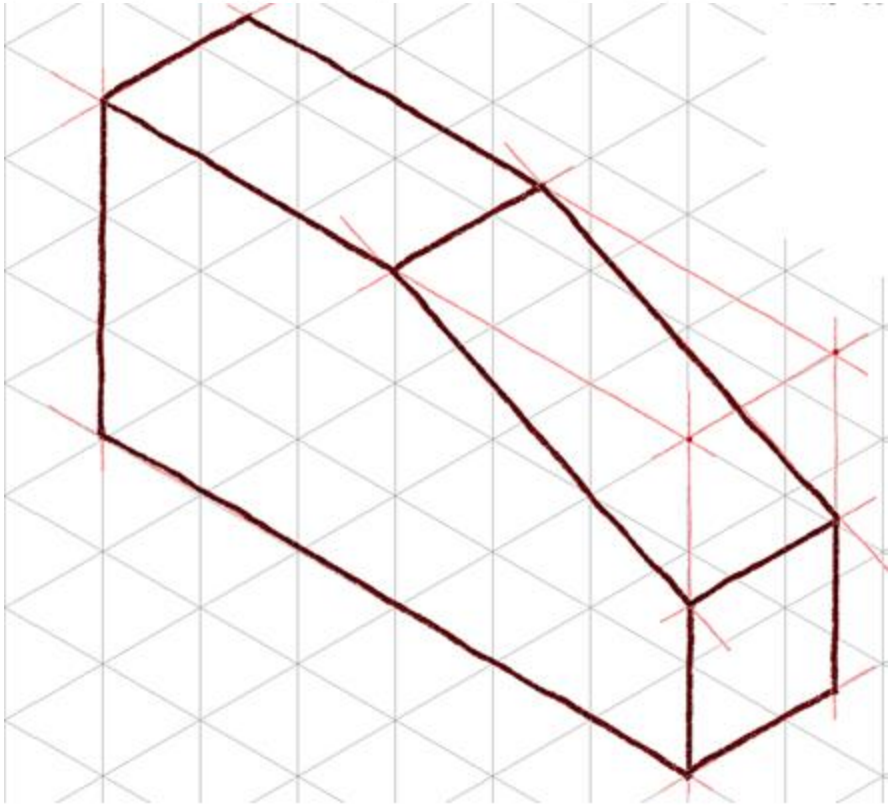
Step 3: Inside Faces

In this case, there are no inside faces.



Step 4: Tonal Shading

- Decide the light source position, and add tonal shading to two of the three faces.
- A shading option is to use parallel lines drawn closely together on a face.
- Increase contrast by cross-hatching lines on darkest face.

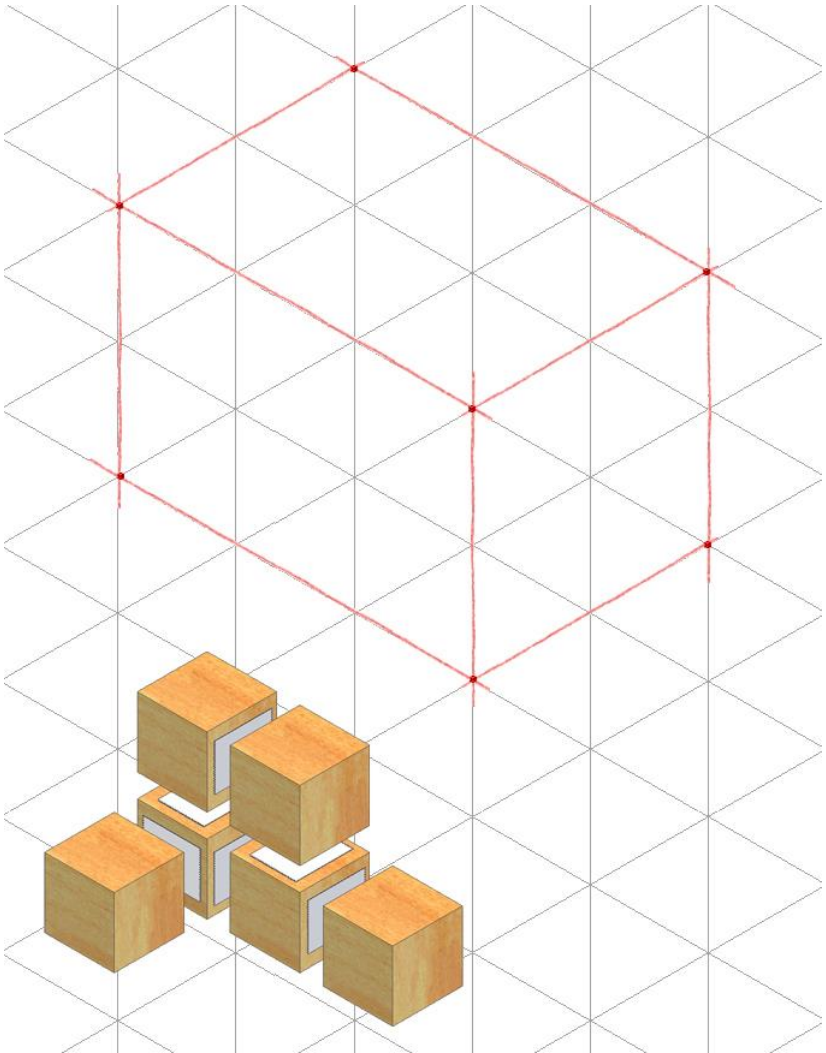


EXAMPLE 2
Isometric Sketch

Step 1: Constructing the Box

Determine the overall dimensions of the object:

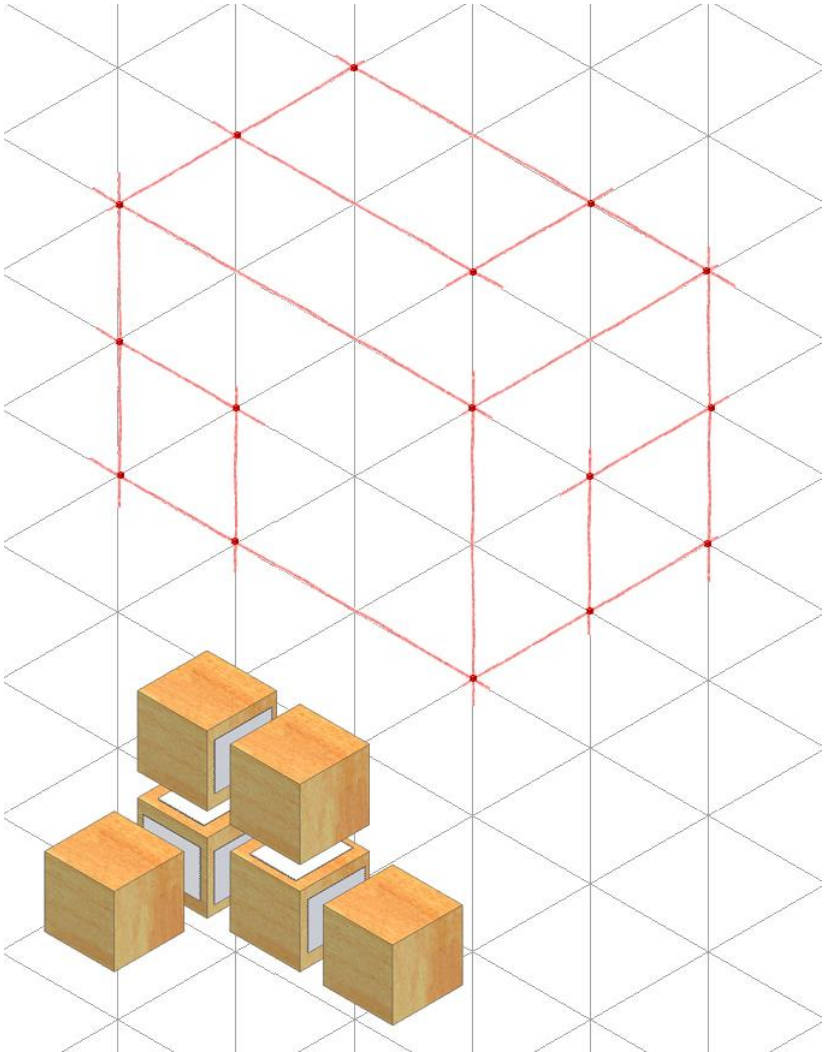
- 3 units wide
- 2 units tall
- 2 units deep



Use points and construction lines to lay out the box.

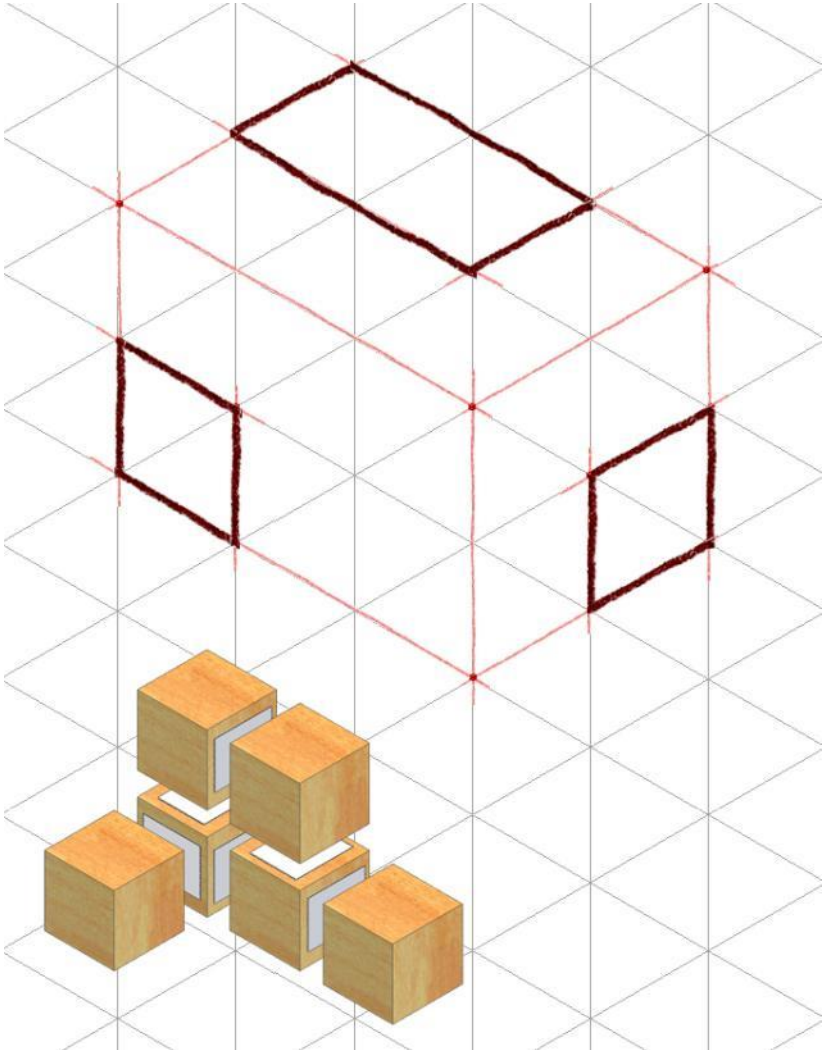
Step 2: Outside Faces

Use points and construction lines to identify corners and edges of object faces that occur on the surface of the box.



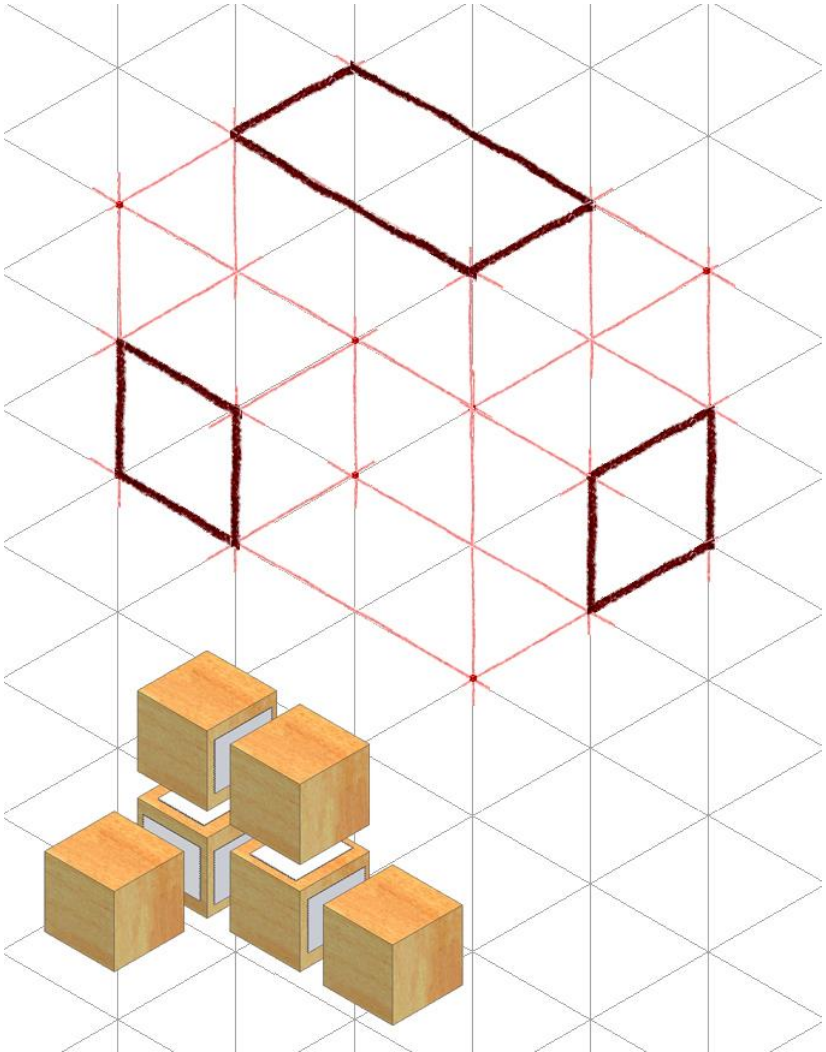
Step 2: Outside Faces (continued)

Before the sketch becomes too congested with construction lines, trace visible edges with object lines.



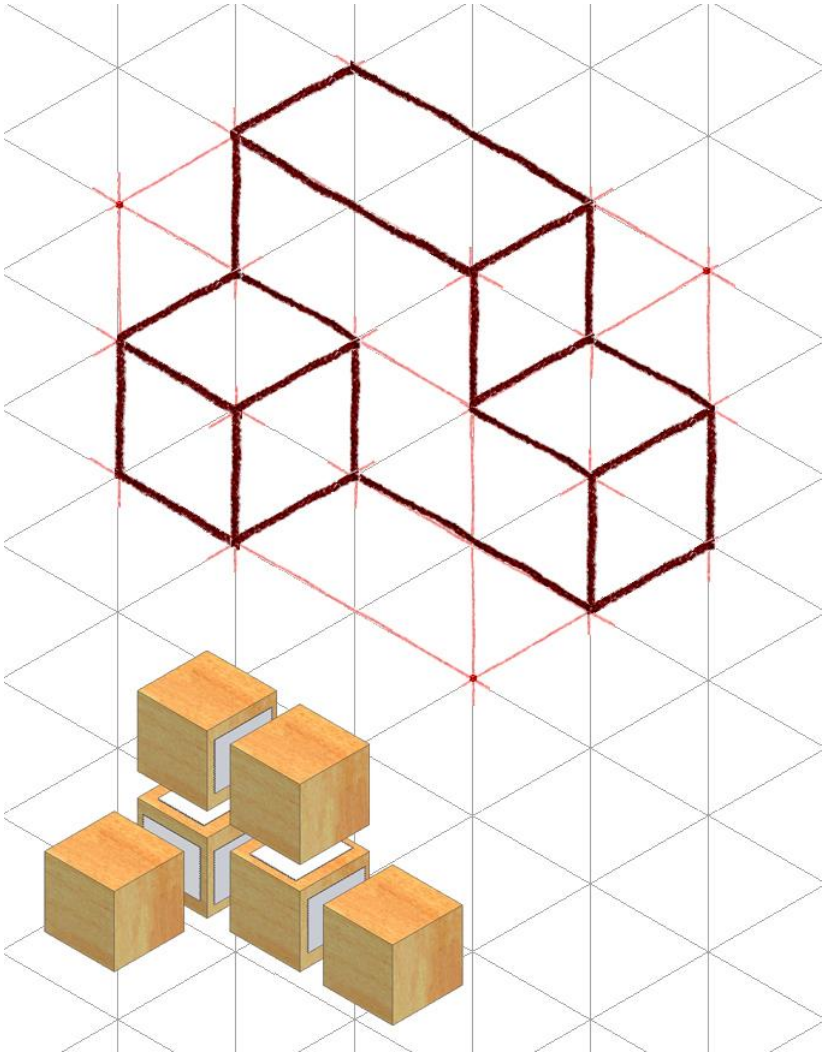
Step 3: Inside Faces

Use points and construction lines to identify the corners and edges of the object faces that occur inside the box.



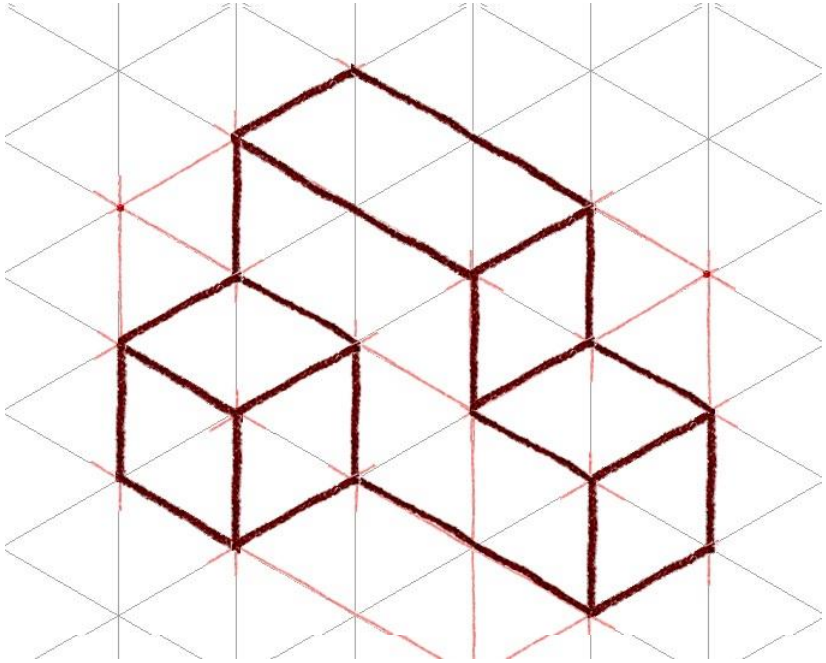
Step 3: Inside Faces (continued)

Trace out remaining visible edges with object lines.

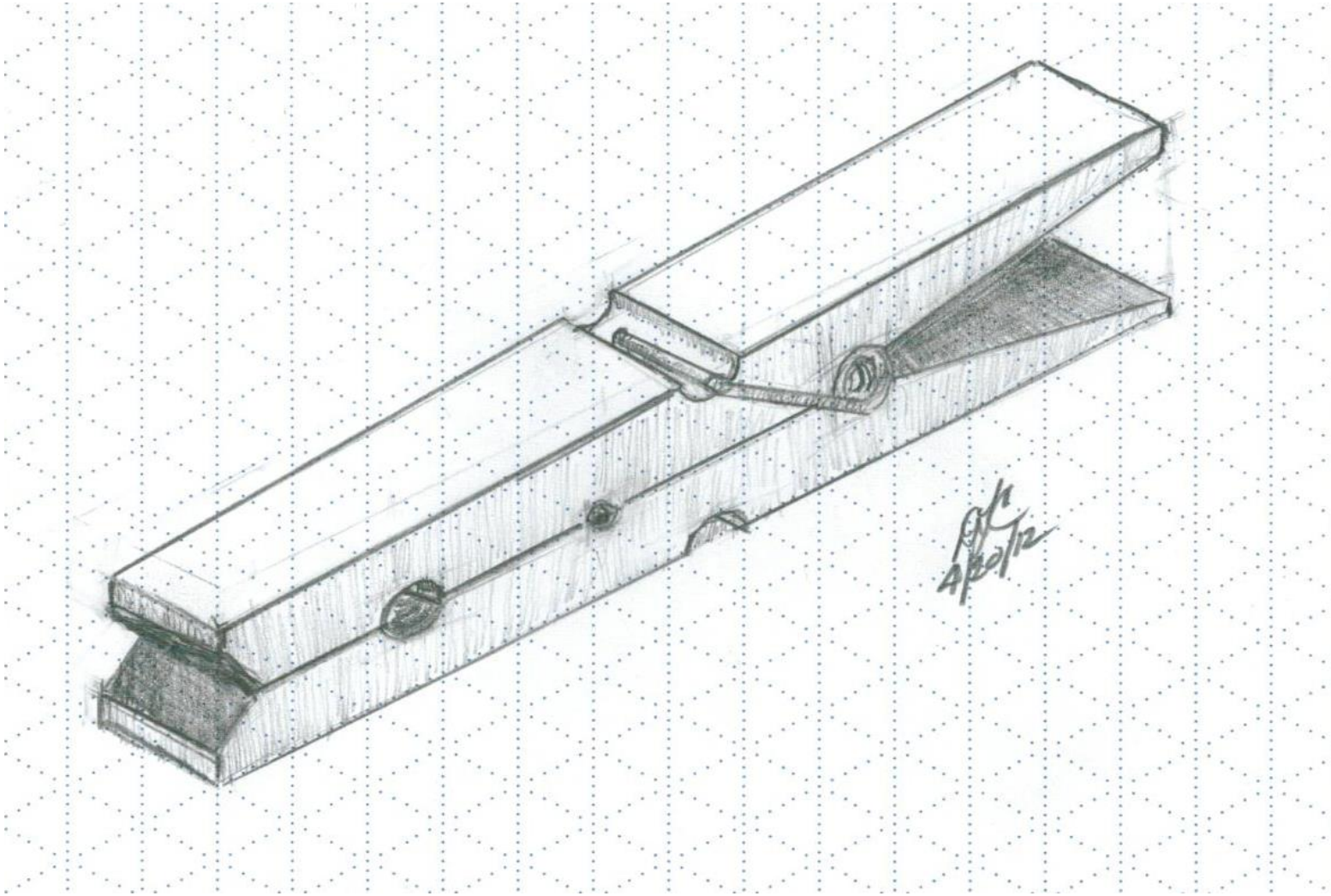


Step 4: Tonal Shading

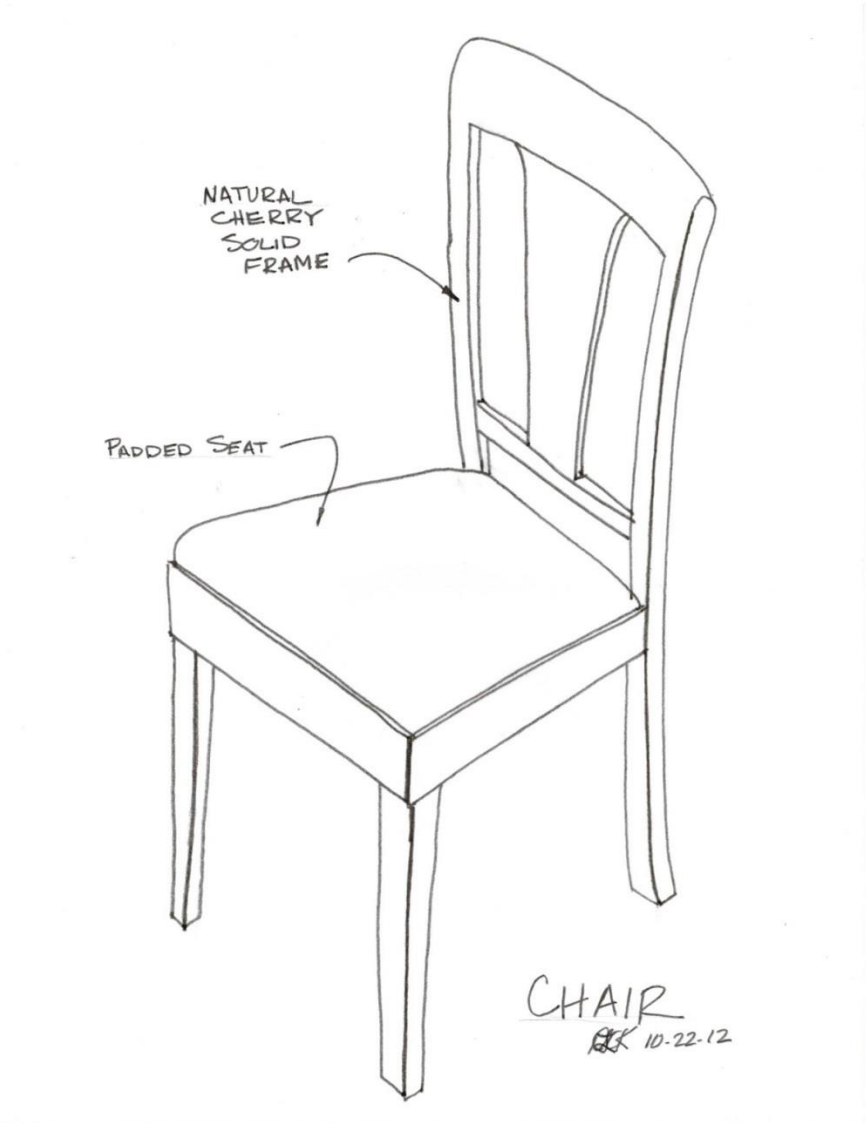
- Decide the light source position, and add tonal shading to two of the three faces.
- A shading option is to use parallel lines drawn closely together on a face.
- Increase contrast by cross-hatching lines on darkest face.



Isometric Sketch Example

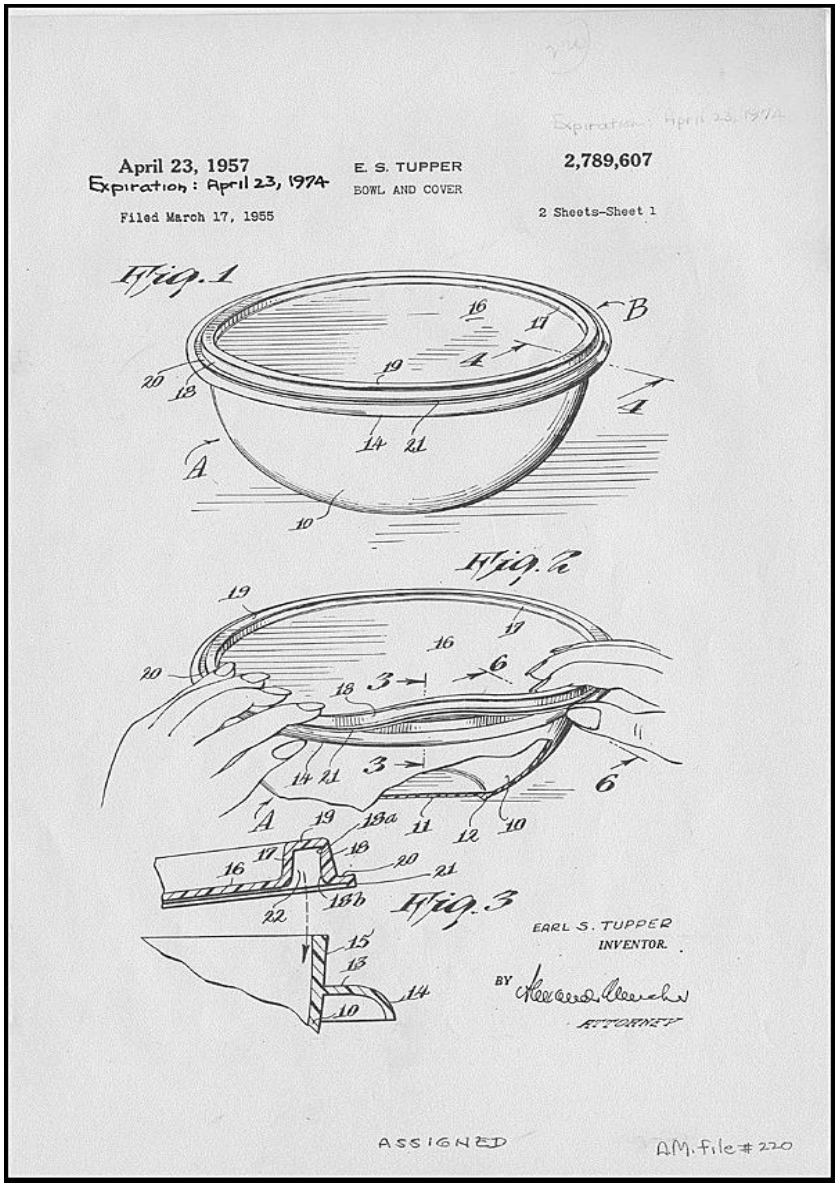


Isometric Sketch Example



Isometric Sketch Historical Example

- Earl Silas Tupper (1907–1983) invented an air-tight Tupper Seal in 1947
- Patent drawings of bowl and cover, 1957 (isometric pictorial)



Patent drawing of bowl and cover, 1957
Earl S. Tupper, Leominster, Massachusetts
printed ink on paper
Doodles, Drafts and Designs: Industrial Drawings from the Smithsonian

Smithsonian Institution
http://www.sil.si.edu/exhibitions/doodles

Courtesy Smithsonian Institute:
http://sil.si.edu/exhibitions/doodles

References

Tupper, Earl Silas. Patent drawings, 1957. Smithsonian Institute: http://sil.si.edu.exhibitions/doodles

Wikipedia (2011). *Three point flexural test*. Retrieved from http://en.wikipedia.org/wiki/File:Threepoint.jpg