Isometric Gelatin

Perspective Drawings are drawings that we use to create the illusion of depth on a flat surface. Isometric Drawing is an example of a perspective drawing in which distances are preserved and lines going back off into the distance to create depth are all parallel. First use some isometric dot paper to draw your initial below.

Step 1 (DRAW THE LETTER) It helps to draw the bottom lines sort of slanted.

Step 2 Extend the lines from each vertex that go up and to the right. The ones that would be visible.

Step 3 Connect the appropriate extended lines.

Step 4 Shade where appropriate.

Now you TRY, It may take some work so make sure to use a pencil. Also, realize some letters are much harder than others but try to make one of your initials.

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This same type of drawing can be created using Geometer's Sketchpad and even animated to look like JELLO.

- First, Open up Geometer's Sketchpad and create a letter with the line tool as shown at the right.

- Then, using the arrow tool, click in a blank area to deselect everything. Now, hold down shift and click on all of the vertices that can be the start of a line segment that goes up, to the right, and doesn't intersect the polygon. Notice the points that are selected in the second figure.

- Select Translate... under the Transform menu and a window like the one below will appear.

- Select an angle between 30° and 50° and a magnitude of about 1 cm or 0.4 inches and push O.K.

- This should translate all of the selected points up and to the right. Next, use the segment tool to connect the dots as shown in the figure at the right.

- Notice the drawing is incomplete. To complete the drawing we will need to construct a few parallel lines. Highlight the point and the line that are highlighted in the figure at the right.
After highlighting the point and the line segment, select **Parallel Line** under the **Construct** menu. This will create a line that passes through the highlighted point and is parallel to the highlighted line.

There is a problem though, we only need a little segment of the line not the whole thing. Using the selection/arrow tool create a point at the Intersection pointed out at the right by clicking on the point.

Next, using the arrow tool highlight the parallel line we created and select **Hide Line** under the **Display** menu at the top. This will hide the entire line but it will leave behind the endpoints of the line segment.

Using the line segment tool construct a line segment between the two endpoints.

Finish off the rest of the segments that need to be created in a similar fashion.

To "color in" the interior of the "M" we will need to highlight all of the original points that made up the "M" in consecutive order (Holding down shift can be helpful. By holding down shift points will stay highlighted even if you accidentally click in a blank space.) and select **Polygon Interior** under the **Construct** menu at the top.

Using the arrow tool select one of the polygon interiors that we created. Under the Display menu we can select different colors. Experiment with using the appropriate colors to help give the illusion of depth.

Finally, to create a jiggling gelatin look create segments to act as “tracks” for animating at most of the original vertices of the original M (images can not be animated because they are defined by the original points or pre-images). See the picture at the right. As shown in the bottom picture, highlight the point you wish to animate and the “track” (segment) the point is to move along. Then, under the **Edit** menu select **Merge Point to Segment**.

After you have finished merging all of the respective points to their “tracks”. Click in a blank space to deselect everything. Finally, highlight all of the points that have been merged (the vertices of the M that are to be animated). Then, under the **Edit** menu select **Actions Buttons**, and **Animate**. Changing the speeds may help add to the effect. You may also want to go back and hide all of the “tracks” that the points are animated along. For an example of the “M” in motion visit [http://wiseone.home.mindspring.com/gsp](http://wiseone.home.mindspring.com/gsp).

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2-Point Perspective Box

Using the two points below draw a rectangular prism using a 2 point perspective drawing.

Now, we can create the same thing using GSP.

I. Start by making a horizontal line segment as shown below.

II. The endpoints of this line segment will be your two points of perspective. Make two more segments as shown below.

III. The new point created will become the top corner of the rectangular prism that is closest to you. Switch back to the selection or arrow tool and click in a blank area to deselect everything. Then, while holding shift down click on the lowest point on the screen and the horizontal line segment. Finally, select Perpendicular from the Construct menu.

IV. Using the point tool, put a point on the new perpendicular line below the lowest point as shown in the diagram below.
V. Using the line segment tool, connect the endpoints of the original horizontal line to the new lowest point as shown below.

VI. Using the point tool, place a point where the top left hand corner of your box will be and the top right hand corner of your box as shown below.

VII. Using the line segment tool connect each point with the point of perspective that it is not already connected to, as shown below.

VIII. Using the point tool, click on the intersection of the two lines that you just made. The picture below will also add labels for the points of the box. YOU DO NOT HAVE TO MAKE LABELS. The labels are only there to help identify the points that instructions discuss.

IX. Using the arrow or selection tool, click in a blank area to deselect everything. Then, highlight the point A, point C, and the vertical line. Finally, select Parallel line from the Construct menu.
X. Then using the arrow tool, click on the points where the new vertical lines intersect with the bottom edges of the rectangular solid.

XI. Finally, hide all of the lines and segments only using the Hide command under the Display menu. (DO NOT HIDE ANY OF THE POINTS) Using the line segment tool, connect each of the points to form a rectangular solid drawn using a two point perspective. Alter the original points to see what happens.

Possible Extensions:
Make a city from a one, two, or even three point perspective using GSP. (Try experimenting with shadow projections)
Just remember:

**Isometric:**
- There are no vanishing points.
- In each dimensional direction parallel lines remain parallel.

**Two Point Perspective:**
- There are two vanishing points.
- In two dimensional directions parallel lines meet at a vanishing point.
- In one dimensional direction parallel lines remain parallel.

**One Point Perspective:**
- There is one vanishing point.
- In one dimensional direction parallel lines meet at the vanishing point.
- In two dimensional directions parallel lines remain parallel.

**Three Point Perspective:**
- There are three vanishing points.
- In all three dimensional directions parallel lines meet at a vanishing point (there are no parallel lines in the picture).
Using the activity in the previous section create 3 or more rectangular prisms (boxes) using the same 2 vanishing points for each rectangular prism and position them so that they could represent a couple of building lining a street.

- Using the free-hand ray tool create some streets that begin at the vanishing points.

- Next, carefully go through your sketch and first construct points of intersections where line segments should stop (this can easily be done by simply clicking on the point of intersection with the selection tool). Then, hide the line segment that shouldn’t be seen behind an object. Finally, go back and reconnect the segment to from the vertex to the intersection where the segment should have stopped.

- At the bottom left hand corner of your screen, create a car, bicycle, or truck using the segment and circle tools. Use the construct polygon interior as well to fill in areas with color. After creating the vehicle, create two horizontal line segments of approximately the same length in the bottom right hand corner of your screen.

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• On the top of the two segments (segment CD), create another segment that starts at point C and has the other end point on the segment CD.

• Highlight the new segment just created (segment CG) and the bottom segment (segment EF) in that order. Then, select **Mark segment Ratio** under the **Transform** menu. An animations should appear flashing a path of segments from the bottom segment to the smaller segment (this denotes the ratio represented is less than one because the path gets smaller).

• Double click on point B. The point should flash denoting that it has been marked as a center.

• Highlight the entire vehicle and select **Dilate…** under the **Transform** menu.

• Finally, highlight the original vehicle and select Hide Objects under the Display menu.

• Click and drag point G to see the animation.

• Highlight only point G and select the **Action Button Animation** under the **Edit** menu.

• Change the direction to “**backward**”, change the speed to “**slow**” and press **OK**.

• This should create a button that when pushed will animate your vehicle driving off into the distance.

• With a little experimentation you can create windows using the Iterate and custom tools.