

Grade Level: 6 - 7

Curriculum: Explorations, ADST

Title of Lesson: Graphic Communication: Isometric Drawing

Learning Goals/Objectives:

- Complex tasks require the acquisition of additional skills.

Materials Needed:

- Paper
- Pencil (not pen!)
- Eraser
- Ruler

Activity Instructions: (Step by Step)

- Perspective drawings work great for rough sketches because they can convey lots of information about an object without spending a long time on the drawing
 - One of the drawbacks of perspective drawing is that they cause the object to appear distorted
 - The closer an object comes to the drawing's vanishing point, the more distorted the object becomes
 - If we wanted to use one of these drawings as a set of plans for building something we would find it rather difficult to use!
 - This is where other drawing styles become helpful
 - Isometric drawings come in handy because they:
 - Show 3 sides of an object (they give us lots of information about a shape)
 - They have very little distortion (the object remains proportional- it doesn't get stretched or squished depending on where it is on the page)
- The first thing we need to help us create an isometric drawing is a sheet of Isometric Grid Paper.
 - This paper looks different from most grid paper you've likely used before because it has little triangles on it instead of little squares
 - When we use the grid paper for most simple shapes, remember that the grid lines are there to help guide us! If you find that lots of your lines are not on the grid lines, start again, but remember to use the grid lines!
- A simple shape for you to start out with is a cube.
 - We already know a lot about cubes:
 - You can probably picture a cube in your head, and some real world objects that are cubes
 - We also know the rules that cubes have to follow:

- They have 6 sides
 - Each side is the same size and shape
 - If we know the length or one side, we are able to draw the whole shape, since each side is exactly the same!
- Start your cube by picking a point on the grid paper where 3 lines intersect somewhere near the centre of the page. Place your pencil here. This is your starting point, and it will form the top corner of our cube.
 - Take your ruler and align it so that it will guide your pencil in a straight line (following the vertical grid line). From your starting point, draw a line vertically towards the bottom of your page, 10 spaces long.
 - This line forms the edge of the cube that appears to be closest to you when you have finished the drawing.
 - Move your pencil back to your starting point. We will work on finishing one side (or plane) at a time. First up, the right side!
 - Using your ruler to follow the gridline that points to the top right corner of the page, draw a line that is 10 spaces long.
 - From the end of this line, draw a vertical line towards the bottom of your page that is 10 spaces long.
 - The last line for this side will connect the bottom ends of both of your vertical lines. The right side of the shape is complete (it should look roughly like a diamond)
 - The left side comes next. We will be drawing a mirror image of the right side of the cube.
 - Return your pencil to the starting point. Using your ruler, draw a line following the grid lines headed towards the top left corner of the page. This line should be 10 spaces long.
 - From the end of this line, draw a vertical line towards the bottom of the page. This one should also be 10 spaces long.
 - You can complete the left side of the cube by connecting the bottom of the left vertical line with the bottom of the centre vertical line.
 - Now is a good point to double check your shape. It should resemble an open book (you might see it opening towards you, or away from you, or even both!). Each of your lines should be drawn on one of the grid lines. If you have any lines that don't, now would be a good time to correct them.
 - To complete the top of the cube we need to draw two lines, which will make the back edges of the shape. We know that both lines are 10 spaces long (because we are drawing a cube).
 - Place your pencil on the top right corner of your shape. Draw a 10 space long line following the gridlines that point towards the top left corner of your page.
 - From the end of this line, connect to the top left point of your shape. This line will follow the grid lines pointing to the bottom left corner of the page, and the line will be 10 space long.
 - Congratulations! You've drawn an isometric cube!

- Your next task is to practise this skill. Draw 4 more cubes, this time, find a space on the page where the cube won't overlap with any other drawings. You may need to make these cubes a bit smaller. If you're feeling confident in your ability to draw cubes, challenge yourself to draw a rectangular prism or two.
- Once you have drawn 5 practise cubes or prisms, try to draw the shapes provided below. You will need 2 sheets of grid paper to fit each shape.
 - If you are still having trouble, try watching this video:
 - <https://www.youtube.com/watch?v=LY5OqKhEP9k&t=0s>



