



Engineering Virtual Learning

HS Introduction to  
Engineering Design  
Lesson #33

May 20, 2020



**Objective/Learning Target:**  
Students will Utilize Drawing Skills  
in Sketching Geometric Constructions.

# Bell-Work:

3D objects can be hard to visualize as you draw them.  
Watch the following videos on Octahedrons.

<https://www.youtube.com/watch?v=GKNIMHxVBMg>

<https://www.youtube.com/watch?v=47yZf6GHqzg>

<https://www.youtube.com/watch?v=uldvd1LA3z4>

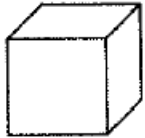
How is this similar and different from the Cubes you drew yesterday?  
(answer in your engineer's notebook)

# Learning Practice: Concept Sketching

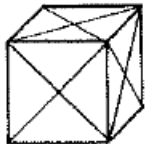
Use your engineers notebook or the Graph Paper printed from the resources link to recreate the following objects: We will use yesterdays cube to construct our Octahedron.

## OCTAHEDRON IN A TRANSPARENT CUBE

### BUILD VISUAL POWER



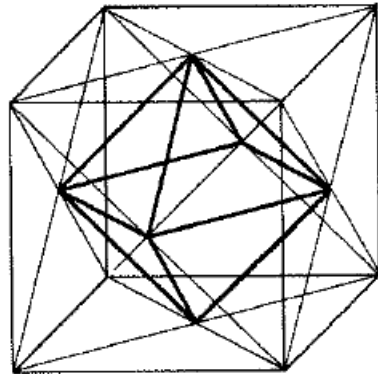
1. Create a 1.25" oblique (cabinet) cube.



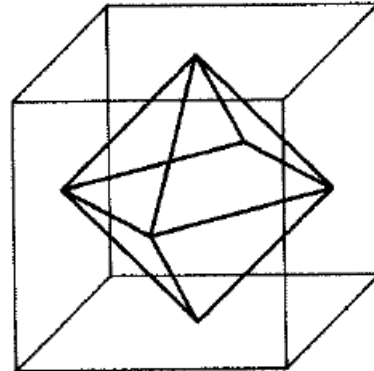
Locate the center of the six sides.

3. Connect these points with diagonals.

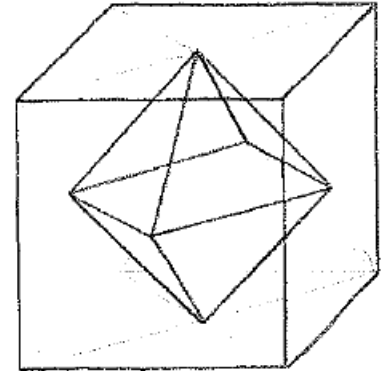
Construct an octahedron in the transparent cube at the right.



Transparent cube with diagonals and octahedron.

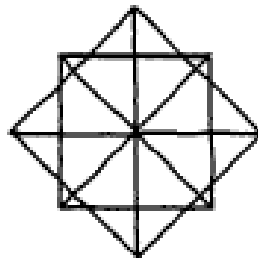
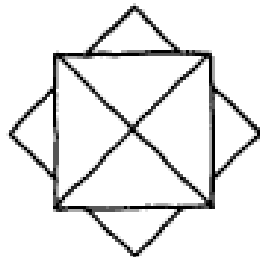
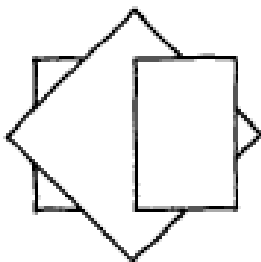


Diagonals removed.

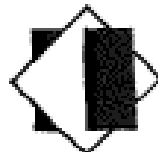
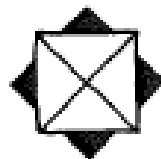
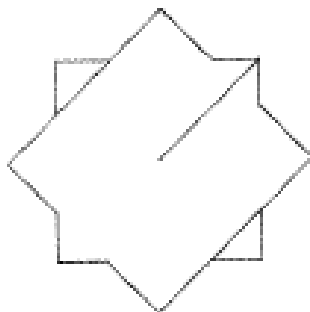
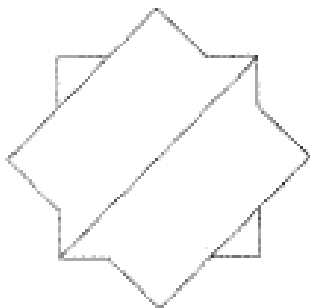


Sketch the transparent cube with the octahedron. Use contrasting line weights to emphasize the octahedron.

Study the transparent forms. In the blank shapes below, create eight different designs. Use shaded areas to develop three-dimensional images as shown in the examples. Develop your designs using freehand sketching only.

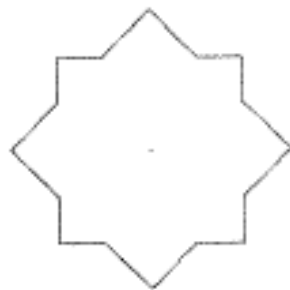
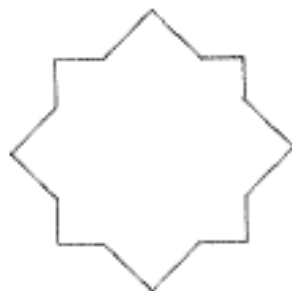
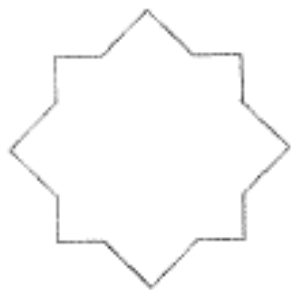
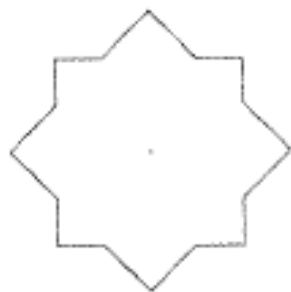
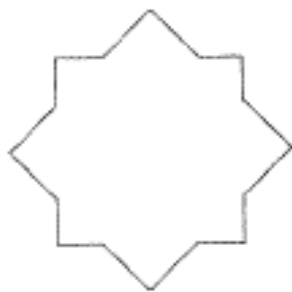
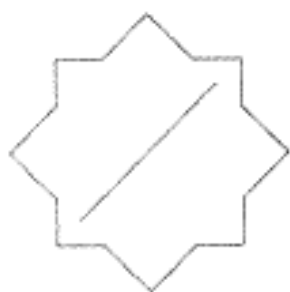


TRANSPARENT FORMS



EXAMPLES

More Shapes on Next Page



BUILDING VISUAL POWERS WITH MONDRIAN FORMS

# Learning Resource Links:

Octahedrons:

<https://www.youtube.com/watch?v=GKNIMHxVBMg>

<https://www.youtube.com/watch?v=47yZf6GHqzg>

<https://www.youtube.com/watch?v=uldvd1LA3z4>

Concept Sketching:

[https://www.youtube.com/watch?v=z8\\_-J8V6E38](https://www.youtube.com/watch?v=z8_-J8V6E38)

<https://www.youtube.com/watch?v=s80WqMyVIsY>

Grid and Isometric Graph paper:

[https://www.printablepaper.net/category/isometric\\_graph](https://www.printablepaper.net/category/isometric_graph)