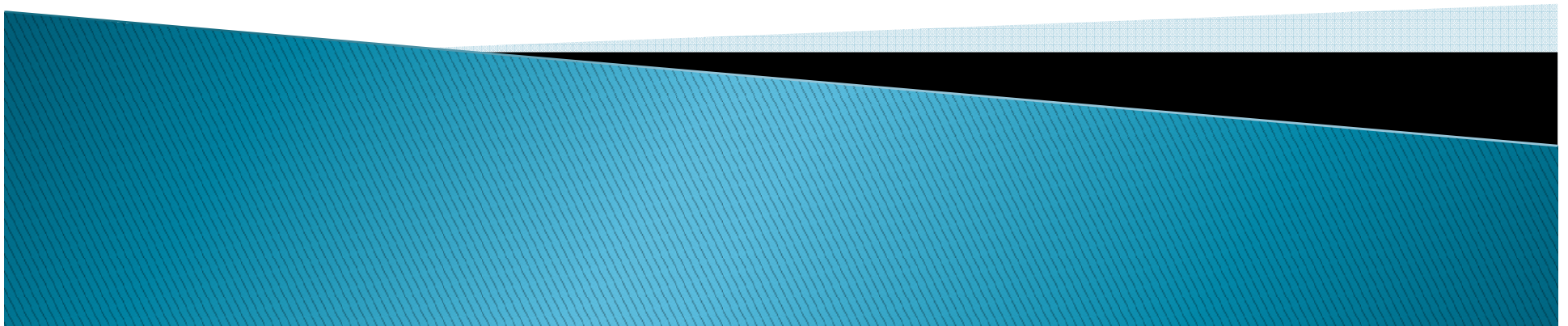


Orthographic Projection

Reference Planes

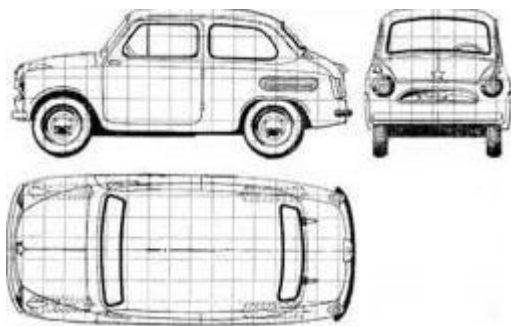


Introduction

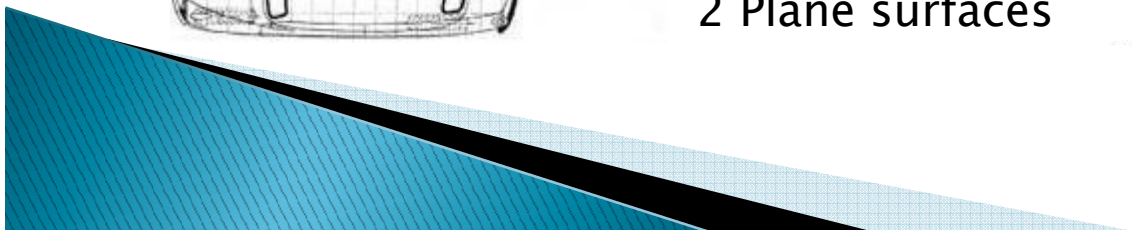
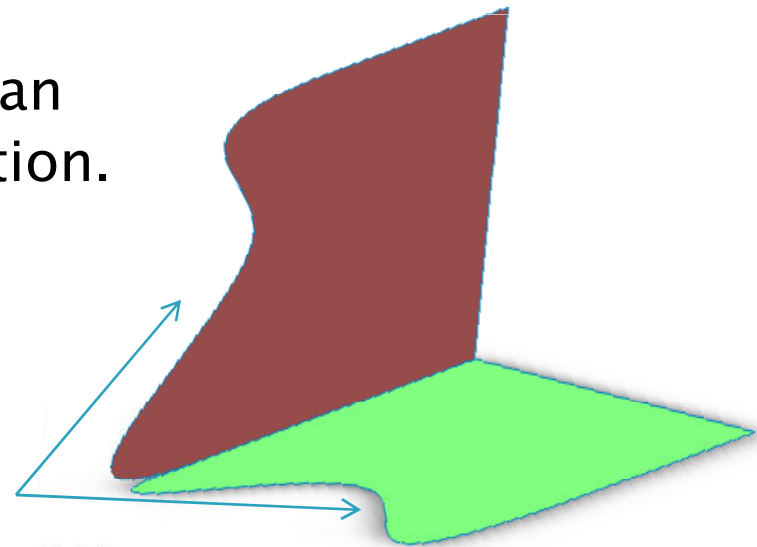
- ▶ Orthographic Projection is a method of representing a three – dimensional object on a *plane surface.

*A Plane surface is a flat surface with no thickness.

A drawing like the one below is an example of orthographic projection.



2 Plane surfaces



Reference Planes

- ▶ In order to construct an orthographic view of an object, it must be **correctly positioned** in relation to a set of **reference planes**.

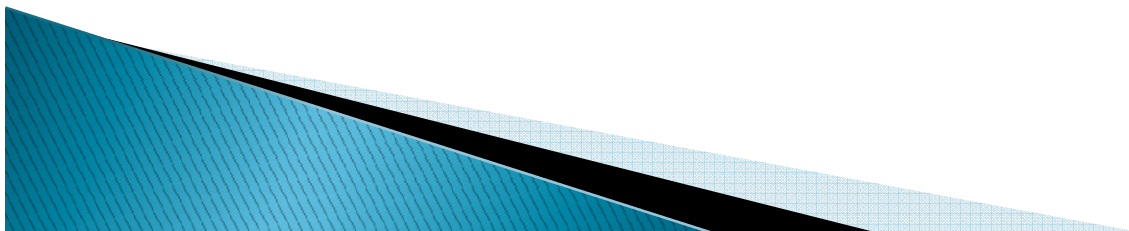
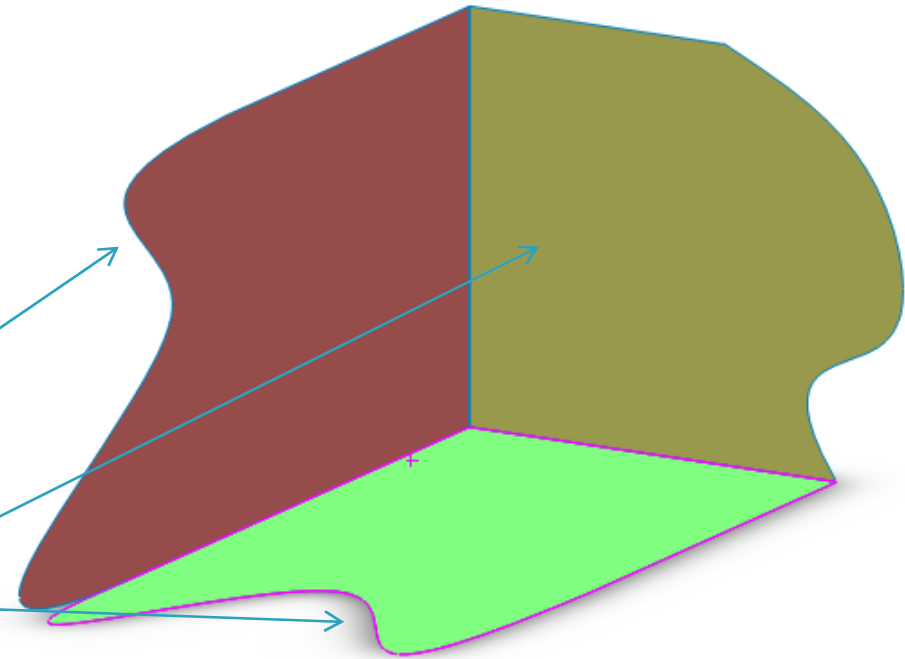
Reference Planes



Terminology

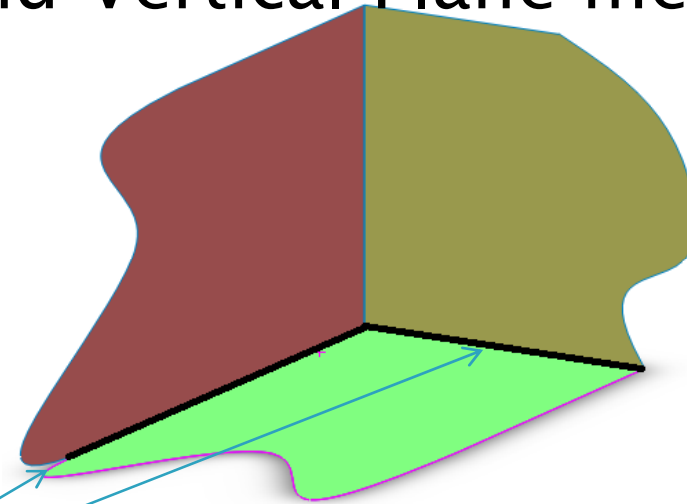
▶ Reference Planes

- Vertical Plane (VP)
- End Vertical Plane (EVP)
- Horizontal Plane (HP)

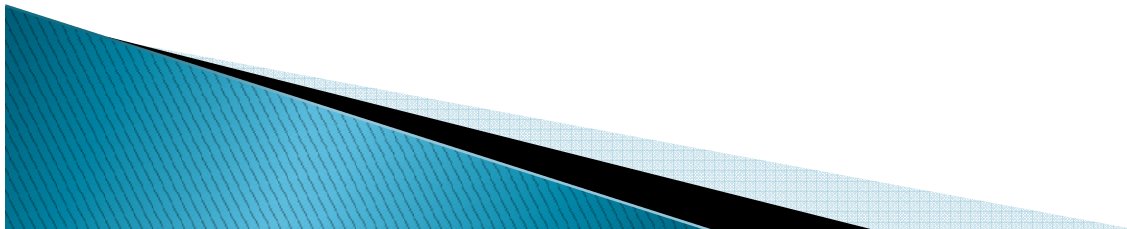


Terminology

- ▶ The **Ground Line** or **XY Line**, is where the Vertical Plane and End Vertical Plane meet the Horizontal Plane.

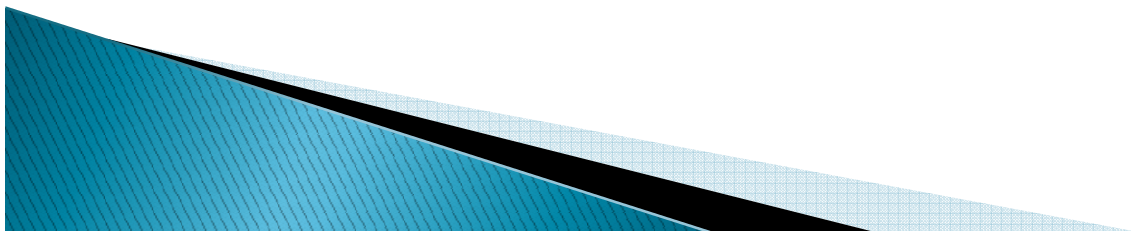


Ground Line (XY)

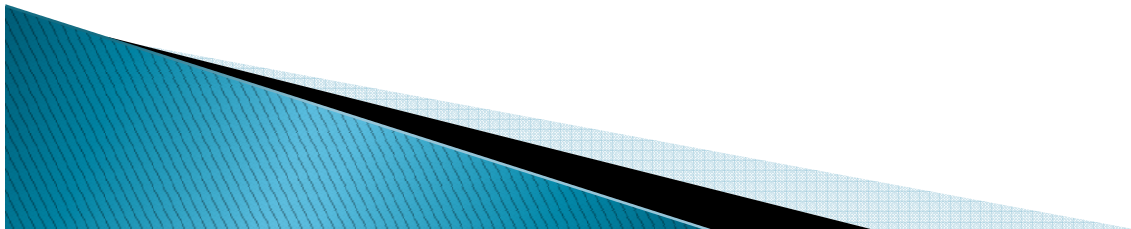


Step 1

- ▶ Now that we know the various planes, we must position the **object** that we wish to create an orthographic view of in **relation to the planes**.
- ▶ The video your about to see shows a **dice resting in space** and surrounded by the reference planes.
- ▶ The video rotates around the dice, focusing in **perpendicular to the three planes** of reference, displaying the space between the dice and the corresponding planes.

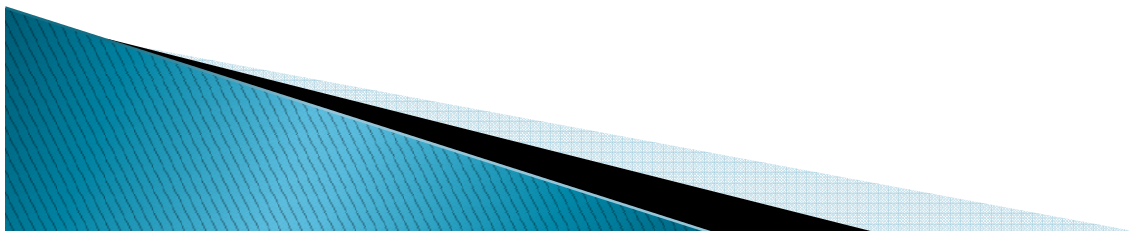


Ortho Video 1

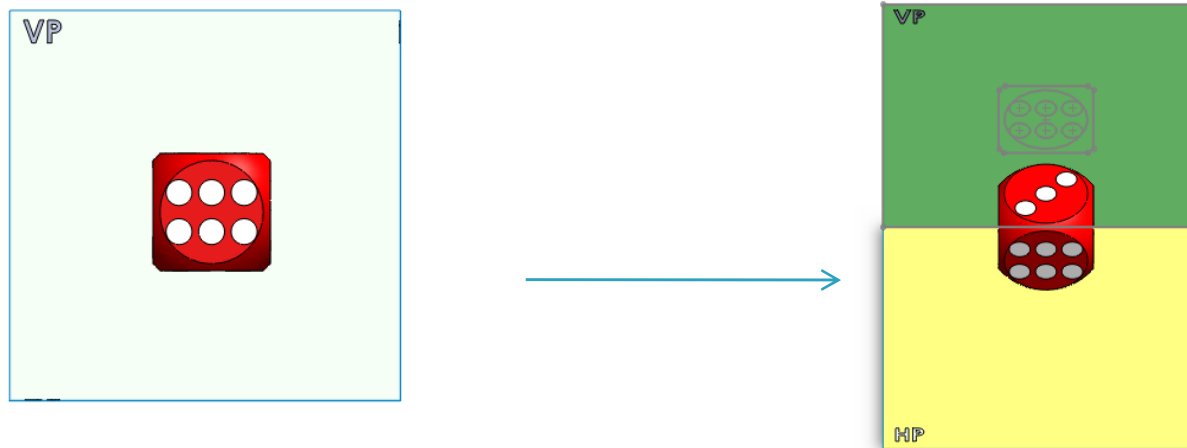


Step 2

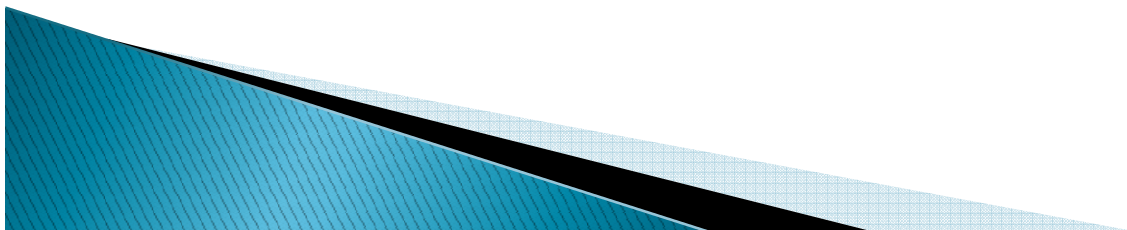
- ▶ Now that we understand the relationship between the dice to the reference planes, we must **project a particular view onto each of the planes.**
- ▶ An single orthographic view is created by looking perpendicular to a face and **drawing the view on the plane behind it.**



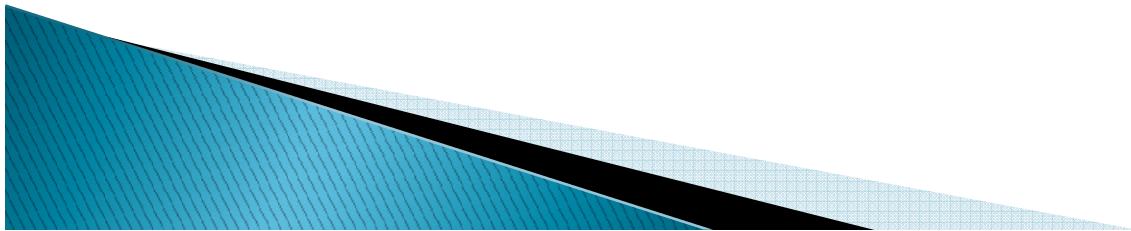
Step 2



- ▶ The first picture looks in **perpendicular to the dice**, where the face of the dice must be **projected back to the VP** and drawn.
- ▶ The second picture shows us the dice which has been slightly **rotated forward**, to show us the image which has been projected back onto the VP.
- ▶ This must be done for **all three planes**.

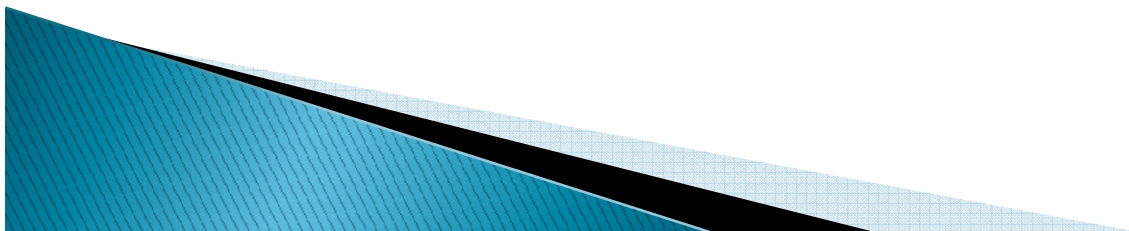


Ortho Video 2

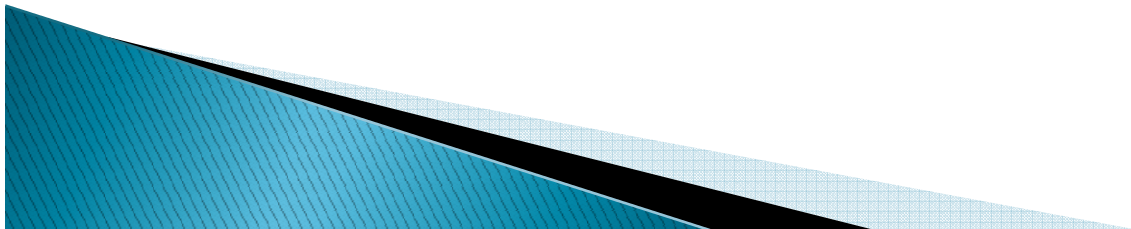


Step 3

- ▶ Now that the various views have been created, we must **unfold the three planes out onto a flat surface** in order to complete our orthographic view of the dice.
- ▶ The **EVP** and **HP** are **folded out flat** onto the same plane as the **VP** to create the orthographic views.

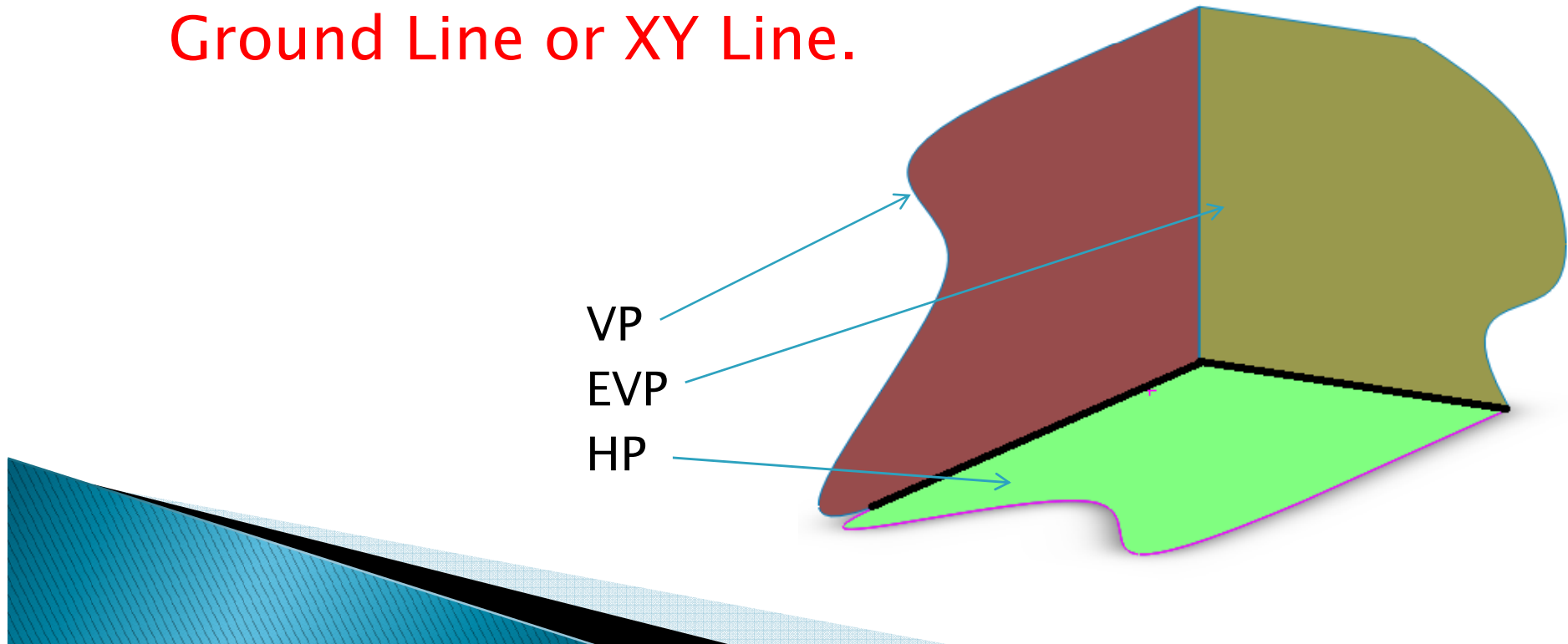


Ortho Video 3



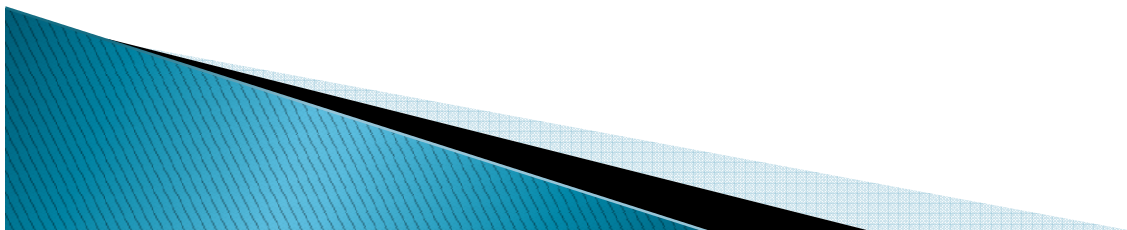
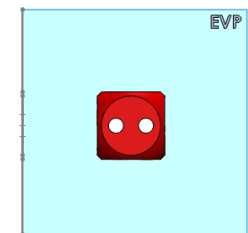
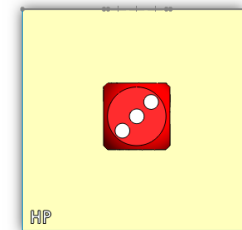
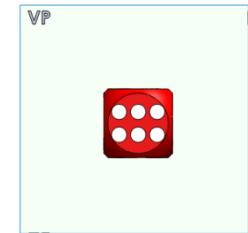
Re-cap – Terminology

- ▶ The line where the **VP** and the **HP hinge** is known as the **Ground Line** or the **XY line**.
- ▶ The lone where the **EVP** and the **HP break away** from each other is also known as the **Ground Line** or **XY Line**.

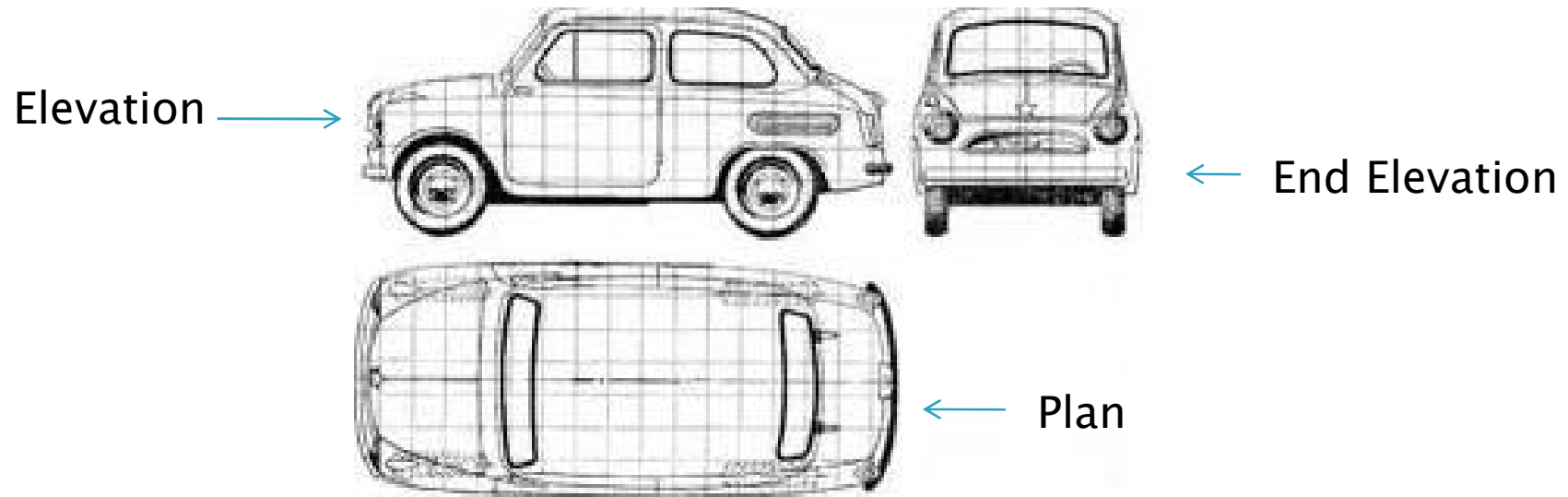


3 Principle Views

- ▶ The 3 views created by orthographic projection are known by the elevation, plan and end elevation.
- ▶ The **elevation** is the **most detailed** of all the views and is always projected on the **VP**.
- ▶ The **plan** always looks from the **top down** on an object and is always projected onto the **HP**.
- ▶ The **end elevation** is always observed from the **end of the elevation** and projected on the **EVP**.



Completed View



NOTE: the distance between the elevation and plan, and the elevation and end elevation is always equal.

