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**Scales**

In plans and maps, ratio is used to make comparisons between actual dimensions and drawn dimensions. This ratio is called a scale.

A scale drawing or model is an enlarged or reduced drawing or model of an object.



e.g. 1:100 means one unit on a drawing is 100 of the same units for the object on the ground.

**note** The first value always represents the drawn dimensions on the map or plan.

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- A map scale is 1:25 000. On the map, the distance between two shopping centres is 4 cm. What is the **actual** distance in km ?  
$$\begin{aligned} 1 \text{ cm on map} &= 25\,000 \text{ cm on ground} \\ 4 \text{ cm on map} &= 4 \times 25\,000 \text{ cm} \\ &= 100\,000 \text{ cm} = 1 \text{ km} \end{aligned}$$
- If 2 cm on a map represents 6 km on the ground, what is the scale?  
$$\begin{aligned} 2 \text{ cm on map} &= 6 \text{ km on ground} \\ 1 \text{ cm on map} &= 300\,000 \text{ cm on ground} \\ \text{scale} &= 1 : 300\,000 \end{aligned}$$

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• A scale is 1:50. The actual length of a desk is 120 cm. What is scale drawing length ?

Scale =  $1 \div 50$  of actual  
=  $1 \div 50 \times 120$  cm = 2,4 cm

• Using a 1:25 scale, find the scale model for a boat if the actual dimensions are 50m x 15m x 22m.



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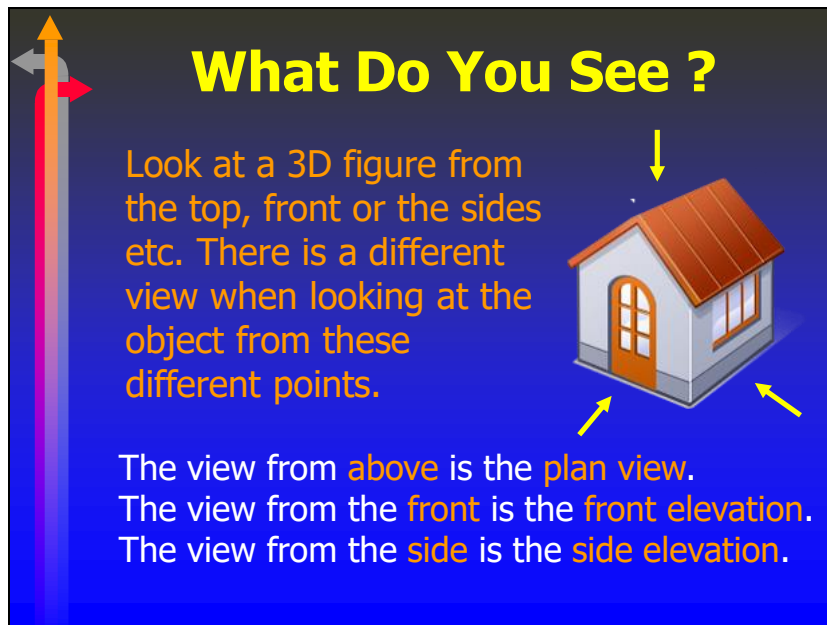
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## What Do You See ?

Look at a 3D figure from the top, front or the sides etc. There is a different view when looking at the object from these different points.

The view from **above** is the **plan view**.  
The view from the **front** is the **front elevation**.  
The view from the **side** is the **side elevation**.

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Architects draw 2D views of 3D buildings to show what the building will look like from each side. These scale drawings are called plans and elevations.

Let's practise "seeing things."

**Hint**



To see what to draw, highlight the edges and faces for a view eg top. Then make that view flat.

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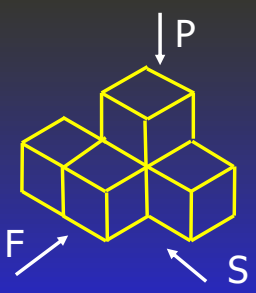
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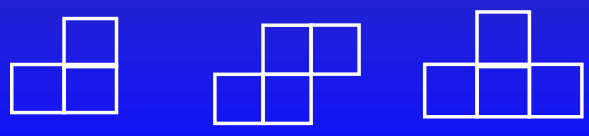
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1. How many cubes were used to make this solid?

2. Identify the plan view (P), the front elevation (F) and the side elevation (S).



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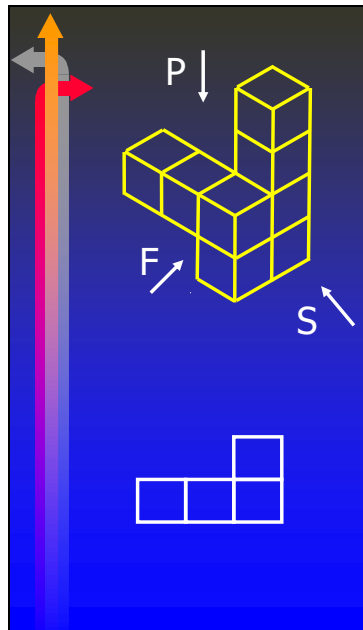
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1. How many cubes were used to make this solid?

2. Identify the plan view (P), the front elevation (F) and the side elevation (S).



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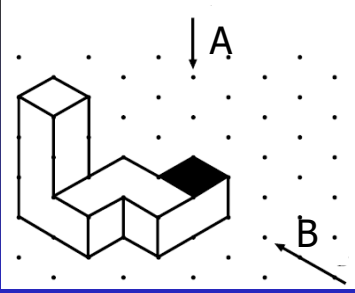
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This 3-D shape is made from seven cubes. One of the faces seen from A is shaded.

- Draw the plan view from A.
- Draw the front elevation from B.

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Three views of a 3D object is shown. Draw the 3D object.

Plan view

Front

Side

Front

Hint: Start with the front and turn it about  $45^\circ$ .

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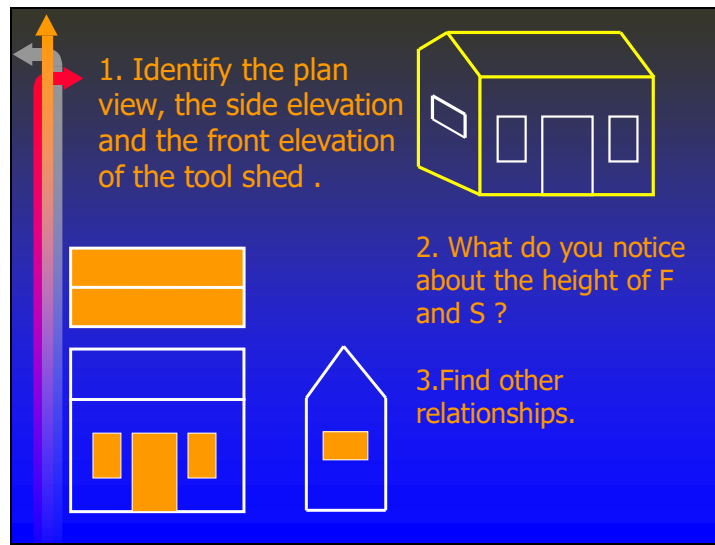
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1. Identify the plan view, the side elevation and the front elevation of the tool shed .

2. What do you notice about the height of F and S ?

3. Find other relationships.

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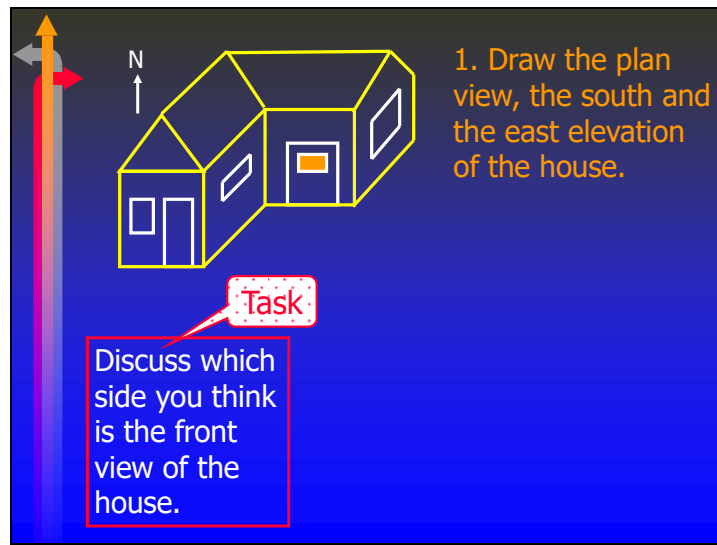
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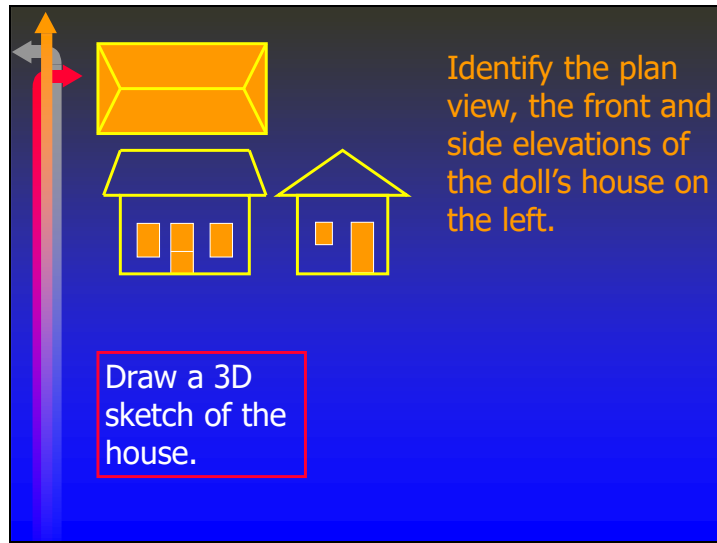
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The diagram shows a 3D perspective drawing of a doll's house with a gabled roof, a chimney on the left side, and a door on the right. To the left of the house are two 2D line drawings: the top one is a rectangle representing the plan view, and the bottom one is a trapezoid representing the front elevation. To the right of the house is another 2D line drawing representing the side elevation. A vertical red arrow on the left points upwards, and a horizontal red arrow points to the right, indicating the viewing directions for the elevations.

Identify the plan view, the front and side elevations of the doll's house on the left.

Draw a 3D sketch of the house.

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