13. Three Dimensional Objects and Nets

❒ Two dimensional drawings of three dimensional objects

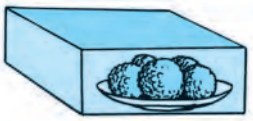
Tai pointed to an object on a slightly high table and asked.

Tai : What is that?

Sharad : That's a card which has a nice picture of *laddoos*.

Tai : Since you're looking at it from the front, it appears to be a card. Let me turn it around a little and put it on the floor.

Sheela : I thought it was just a nice picture on a card. But the picture is actually pasted on a box.



Tai : At first, you only saw the front surface. Now, when you look from above and from a different angle, you can see three different surfaces and you can also see that it is actually a three dimensional box.

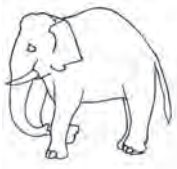
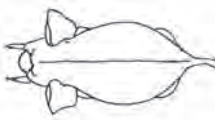
Sharad : What does three dimensional mean?

Tai : Three dimensional objects are objects whose length, width and height can be seen, felt or measured. Books, glasses and tables are some three dimensional objects. Objects which have only length and breadth and no thickness or negligible thickness can be called two dimensional objects. Sheets of paper, pictures on paper and shadows are some examples of two dimensional figures.

Sheela : Actually, objects are three dimensional. Their pictures on paper are two dimensional.

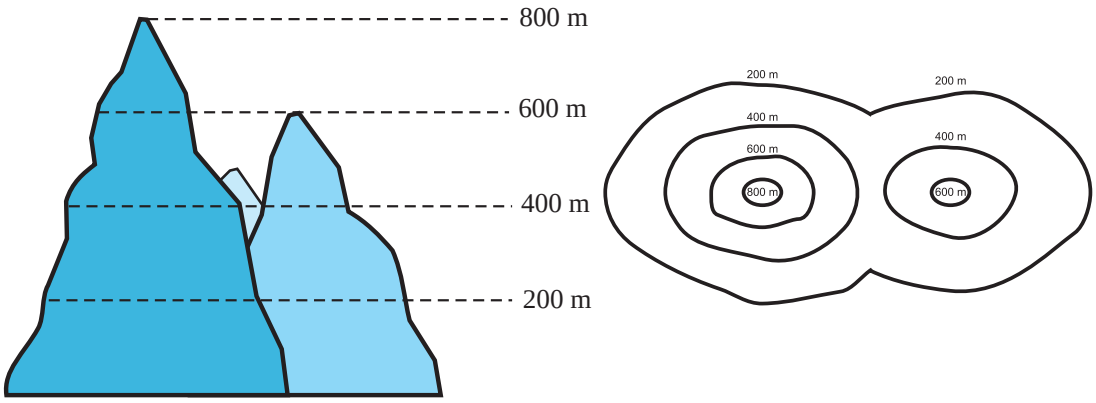
Sharad : That is why, some pictures seem flat. But some pictures are drawn in such a way that we can sense the depth or thickness of the objects.

Tai : Let me show you a chart. It shows how three dimensional objects appear when seen from the front, from the side and from above. Study it carefully.

Object	The object as seen –		
	from the front	from one side	from above
Elephant			
Cupboard			

Looking at hills in the distance, we can see how tall and broad they are. But, we cannot tell how much area they occupy on the ground. One has to go up and above them in a helicopter to see how much area they occupy on land. But then, from there we cannot see how high they are. Therefore, to show the area over which a hill is spread and also how high it is in its different parts, two figures like those below are drawn.

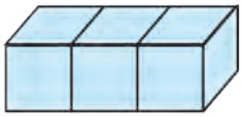
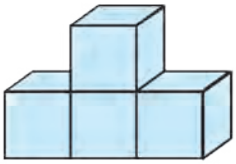
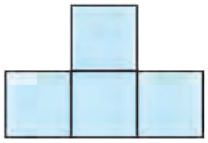
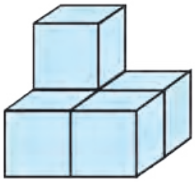
In figure 1, we see hills as from a distance. The lines show their approximate heights. Figure 2 shows the extent of land they occupy as seen from above and the curved lines show their different heights in different parts. For example, the line that shows 800 m indicates a height of about 800 m.



In Geography, such diagrams are used to show mountains on maps.

Problem Set 51

1. The first column shows a structure made of blocks. The other columns show different views of the structure in two dimensions. Say whether each view is from the front, from a side or from above.

	Block formations	View of formations		
(1)				
(2)				
(3)				

2. Draw three pictures of each of these three dimensional objects – a table, a chair and a water-bottle as viewed from the front, from a side and from above.

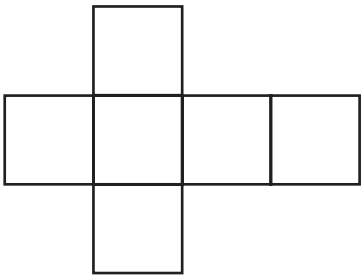
❒ Nets

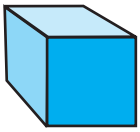
Last year we saw that cutting some edges of a box and laying it out flat gives us the net from which it was made.

The two dimensional shape from which a three dimensional object can be made by folding is called the 'net' of that object.

(1) By folding the cardboard shown below, along the lines shown in it, we get a three dimensional object (box). In this shape, all surfaces are square.

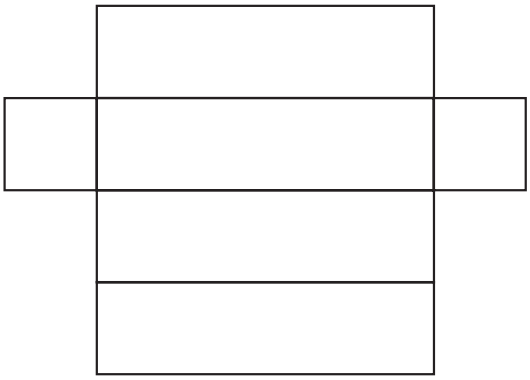
An object of this shape is called a cube.





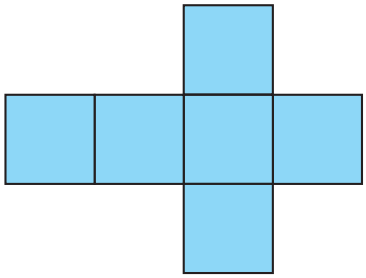
(2) The net of another cardboard box is shown in the figure below. By folding along the lines in this net and joining the edges to each other, we can see that a three dimensional box is formed. The surfaces of this box are rectangular in shape.

An object of this shape is called a cuboid.

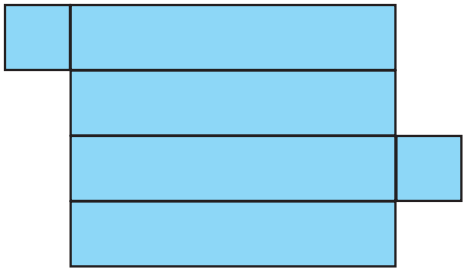


Activity : Draw the nets shown below on card sheet. Cut out the shapes and find out the shapes of the boxes they form.

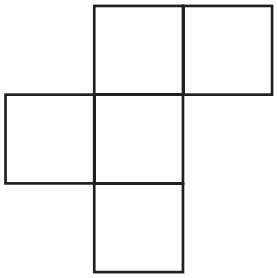
(1)



(2)

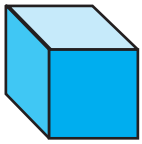


❒ A five-square net (Pentomino)



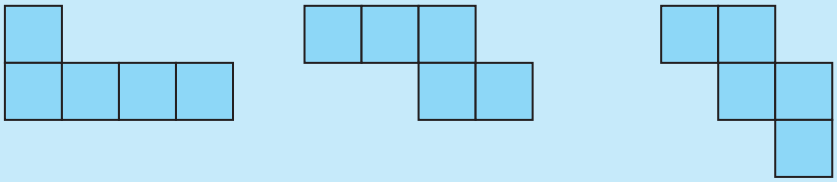
In the figure alongside, five squares of the same size are placed together with their sides joined.

Such an arrangement of five squares is called a 'five-square net' or a 'pentomino'.



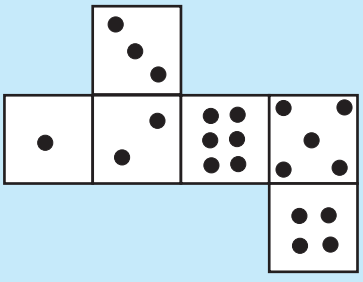
By folding along the edges of such a five-square net, an open box is formed.

Activity : Some five-square nets are given below. Draw these nets on a card sheet. Make open boxes from these nets.

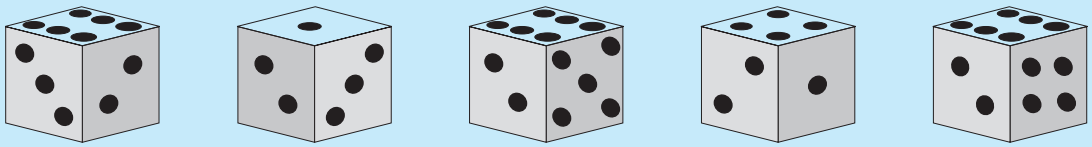


Try to find out other five-square nets that can be used to make open boxes.

A riddle



The net of a cube-shaped dice is given alongside. If a dice is made of this net, which of the following shapes will it definitely *not* resemble ?



(1) (2) (3) (4) (5)

✦✦✦