SPATIAL REASONING: 3D CUBES

Required Materials

3D Cubes

Overview (p. 343 in TM for TEKS/NCTM strands; p. 70 in SM)

In this activity, students will learn how to identify relationships between different representations of three dimensional figures. 3D figures will be represented in the following three ways: a) three dimensional (3D) view, b) two dimensional top, front, and side views and c) two-dimensional numerical representation.

Examples

1. Use the various representations in the left hand column from the ***Example Figures*** page to assist students in creating an appropriate three dimensional figure.

   a) Start with the numerical representation as it is the easiest one to start with. Notice that the "net" gives us a footprint (base level) to work from. Each number tells us exactly how many cubes to stack in each part of the footprint. We begin with a 2 x 2 footprint (4 total cubes). Stack another cube on all base cubes (except front left).

   b) Have students verify that their figure looks like the 3D view, given directly above the numerical representation on the ***Example Figures*** page.

   c) Finally, have students verify that their front, side, and top views (from their created model) match the answers given on the ***Example Figures*** page.

2. Repeat the process listed in #1 using the figures from the right hand column on the ***Example Figures*** page.

Practice

1. Have students match the practice figures (various views/representations) and complete the table. Note: Allow students to use the building blocks along with the two dimensional images to complete the table.

   Complete the Table by Filling in the Appropriate Letter for Each Column

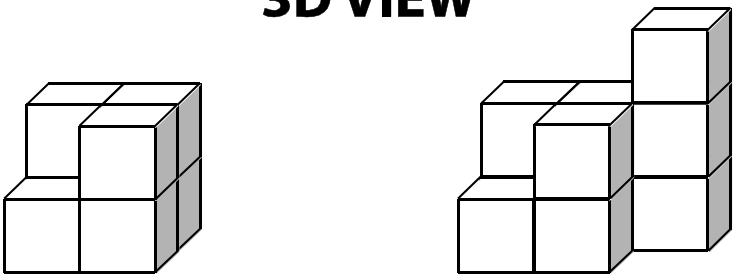
Numerical Representation	3D View	Front View	Side View	Top View
A	C	I	C, D or H	A
B	F	B or G	B	B or G
C	E	C	E or J	C or F
D	D	H	A or F	D or I
E	J	E	G	E or H
F	H	D	C, D or H	C or F
G	A	B or G	I	B or G
H	B	J	E or J	E or H
I	I	A	A, F	D or I
J	G	F	C, D or H	J

Extra Practice

1. Ten numerical representations are given on the ***Extra Practice Figures*** page. Have students create 3D figures and draw the front, side, and top views for each.

2. Have students create five 3D figures and draw the numerical representations along with the front, side, and top views for each. Use a blank sheet of paper or **Board #35**. Have a partner try to recreate each 3D figure from the two dimensional representations.

3D VIEW

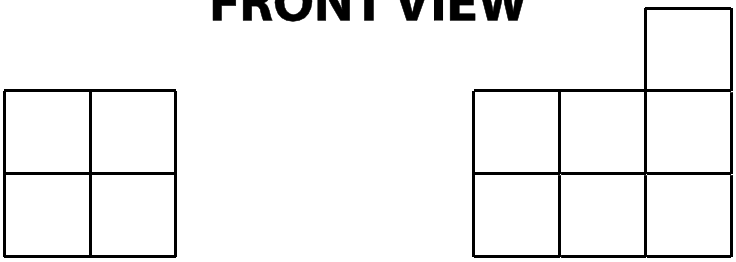


NUMERICAL REPRESENTATION

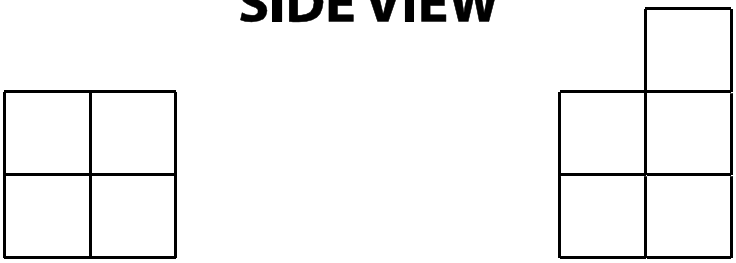
2	2
1	2

2	2	3
1	2	

FRONT VIEW



SIDE VIEW



TOP VIEW

Example Figures

NUMERICAL REPRESENTATIONS

A

3	2	1
1	1	2

B

1	3	3
2	1	
2	2	

C

1	1	
2	1	2

D

2	1	3	4
1	3	1	3
2	1	2	2

E

2	1
2	2

F

2	2	
1	2	3

G

2	3	3
1	2	
1	1	

H

1	2
1	1

I

1	2	1	4
2	3	2	3
1	2	1	1

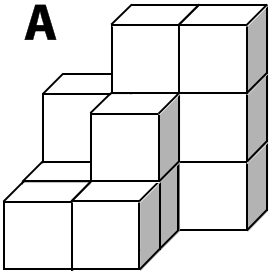
J

1	1	3
2	1	

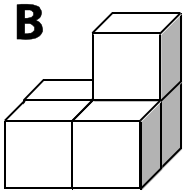
Practice Figures

3D VIEWS

A



B



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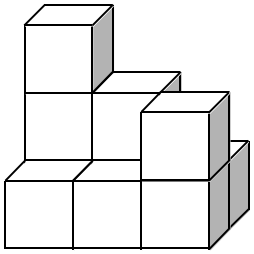

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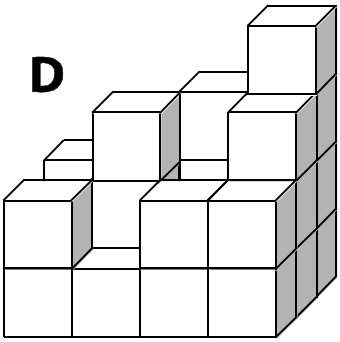

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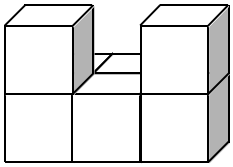

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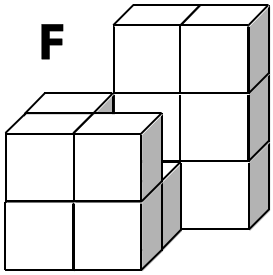

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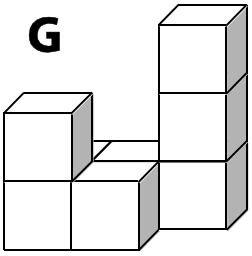

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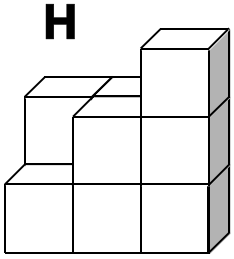

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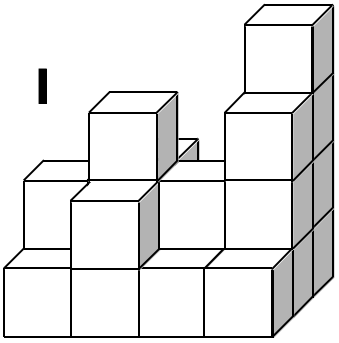

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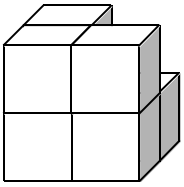
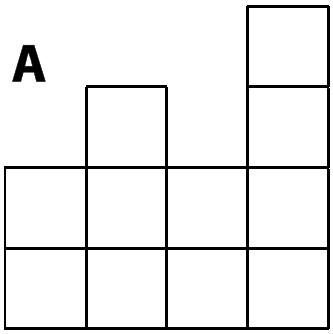


Practice Figures

FRONT VIEWS

A



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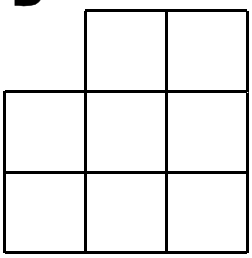

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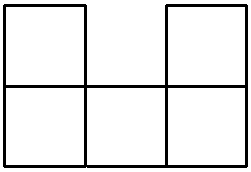

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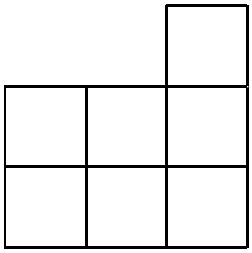

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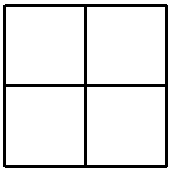

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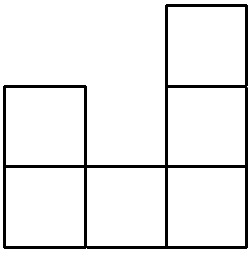

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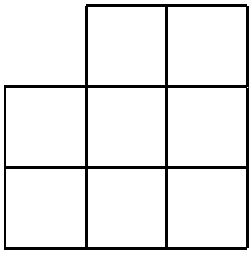

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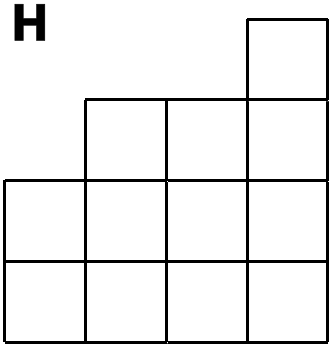

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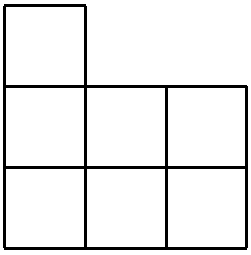

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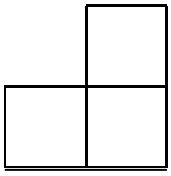
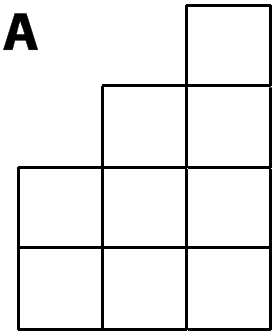


Practice Figures

SIDE VIEWS

A



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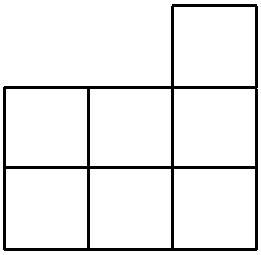

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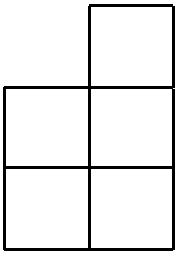

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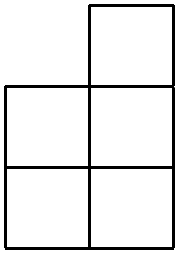

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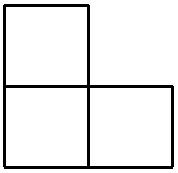

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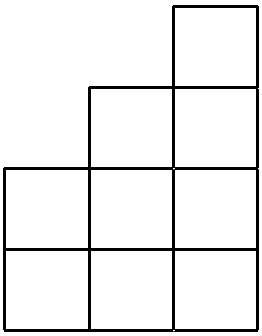

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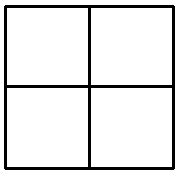

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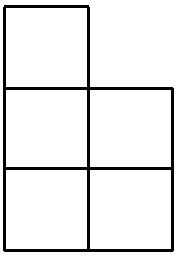

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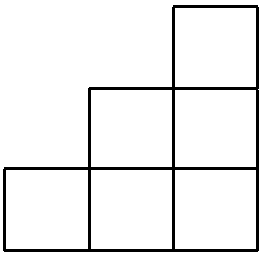

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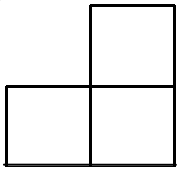
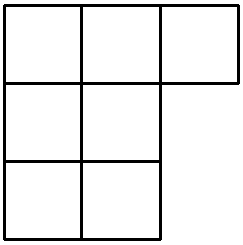
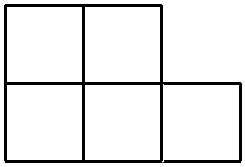


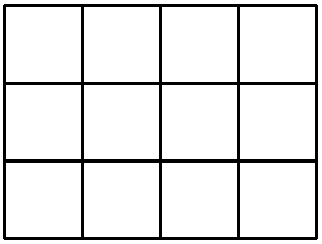
Practice Figures

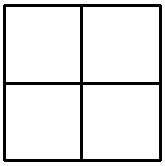
TOP VIEWS

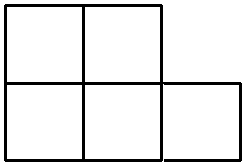
A 

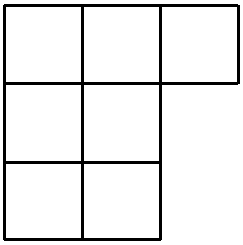
B 

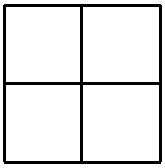
C 

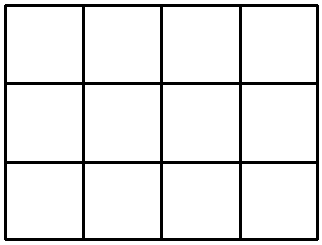
D 

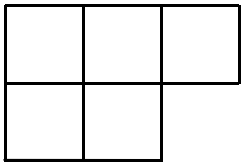
E 

F 

G 

H 

I 

J 

Practice Figures

EXTRA PRACTICE

1.

3	1
1	1

2.

2	1
2	2

3.

1	1	
2	1	3

4.

2	2	
1	2	1

5.

2	2	3
1	2	

6.

3	1	2
2	2	1

7.

2	3	3
1	2	
1	1	

8.

1	3	3
2	1	
2	2	

9.

1	2	3	1
2	3	2	3
1	2	1	1

10.

2	1	3	1
1	3	1	3
2	1	2	2

Extra Practice Figures