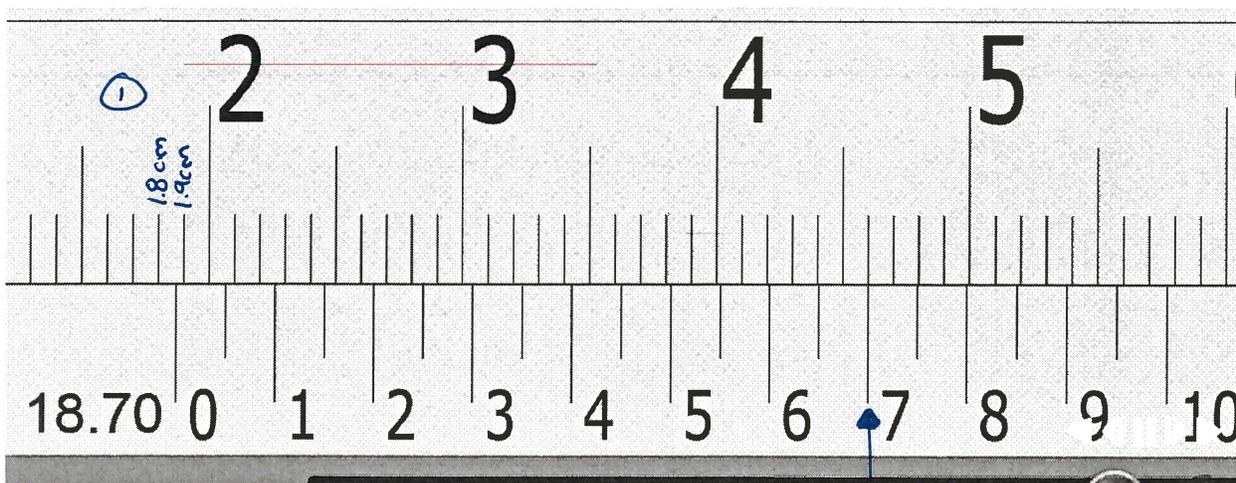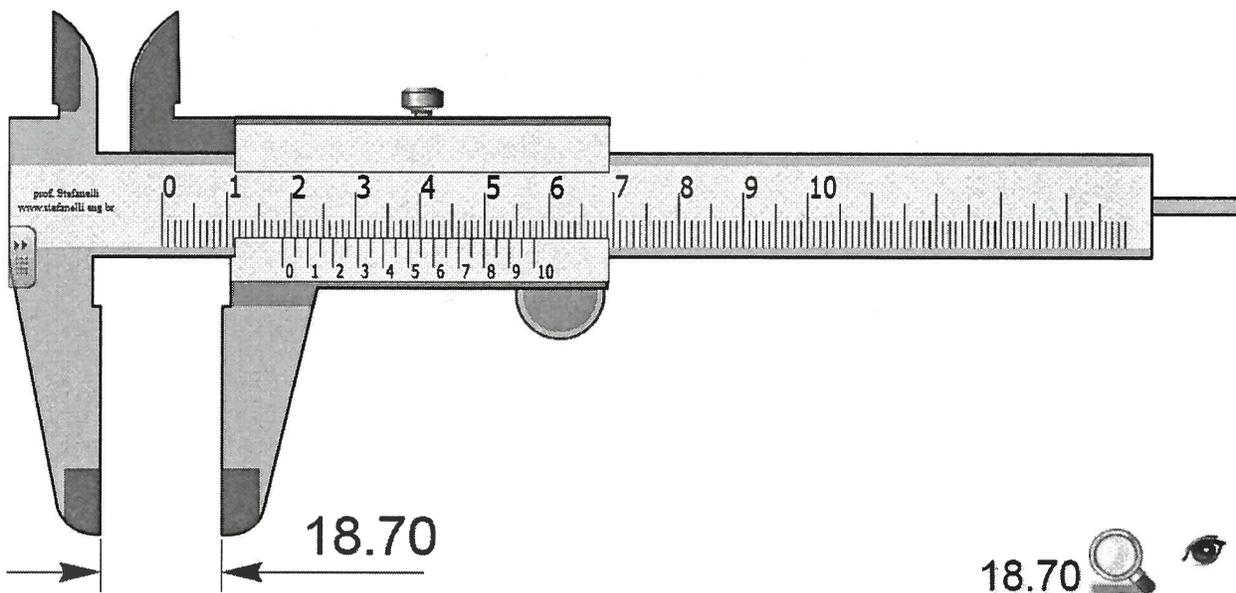**KEY**

L01 – Introduction to Vernier Calipers, Net Diagrams, SA and VOL

Today's lesson will be conducted in two parts:

- First Half: Direct Instruction
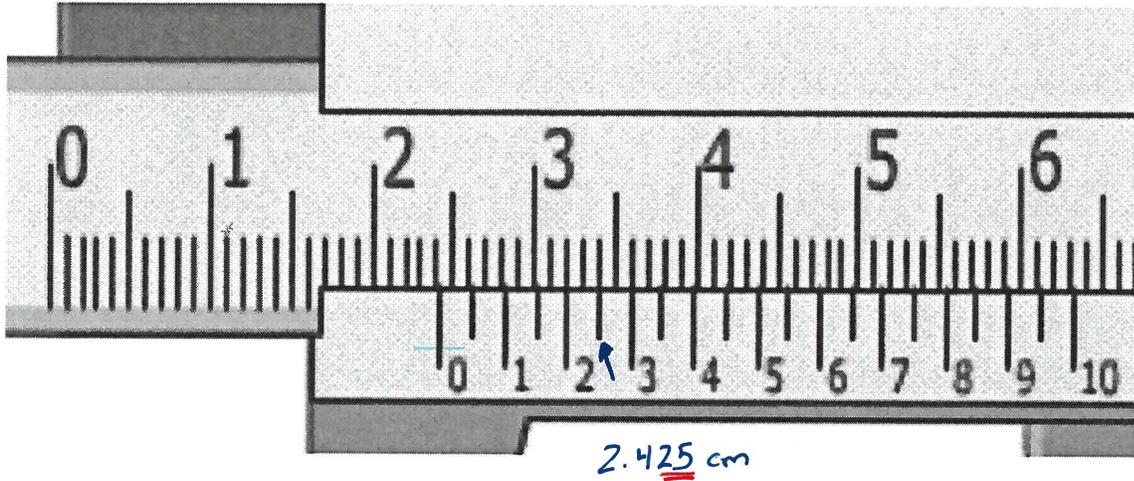- Second Half: Students rotating between stations

Part 1 – Vernier Calipers

http://www.stefanelli.eng.br/en/en-vernier-caliper-pachymeter-calliper-simulator-millimeter-05-mm.html
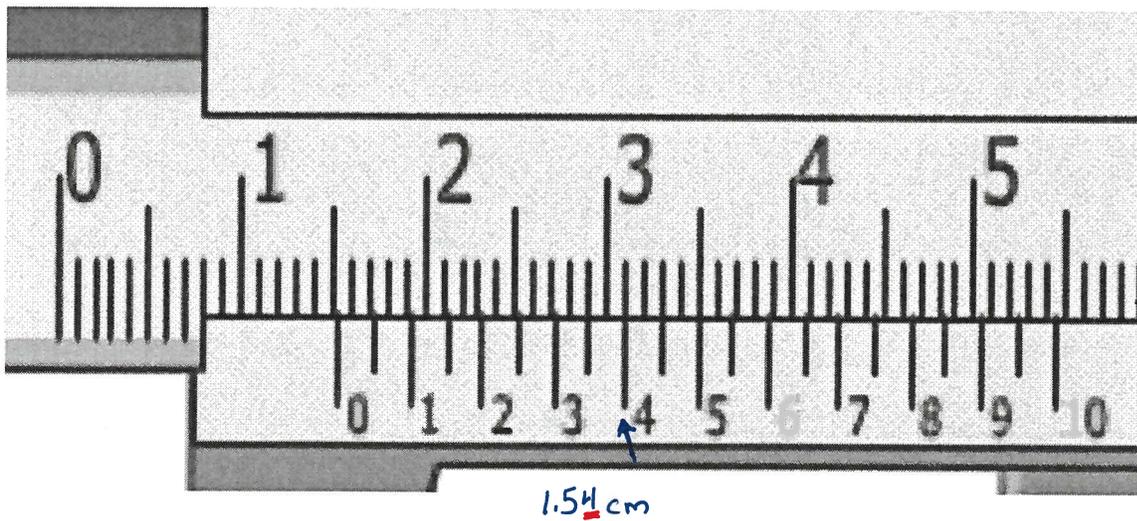

18.70

18.70

① Measurement is between 1.8cm and 1.9cm.

② The "7" line is best.

So 1.87cm.

① 1.8cm 1.9cm
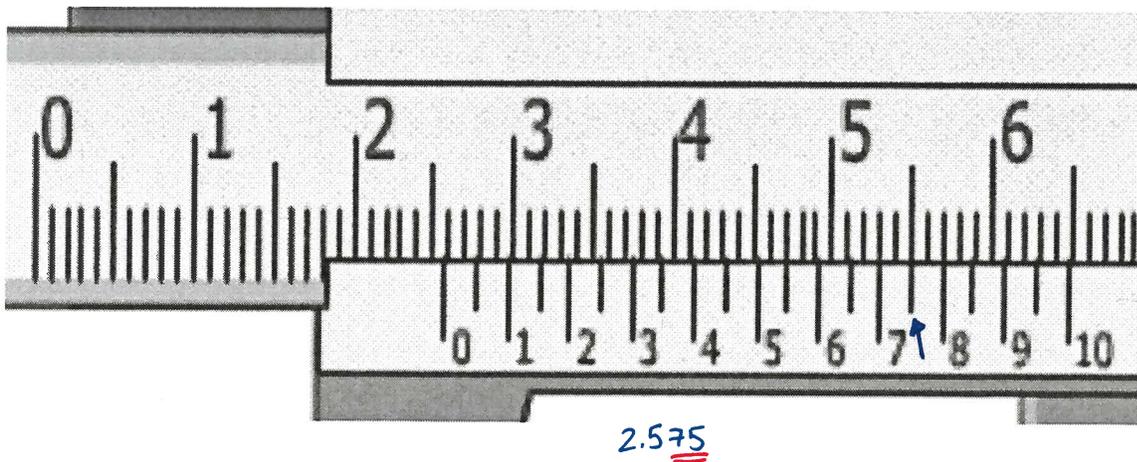
② This one lines up best.

KEY

Q1: What is the measurement?

2.425 cm

Q2: What is the measurement?

1.54 cm

Q3: What is the measurement?

2.575

KEY

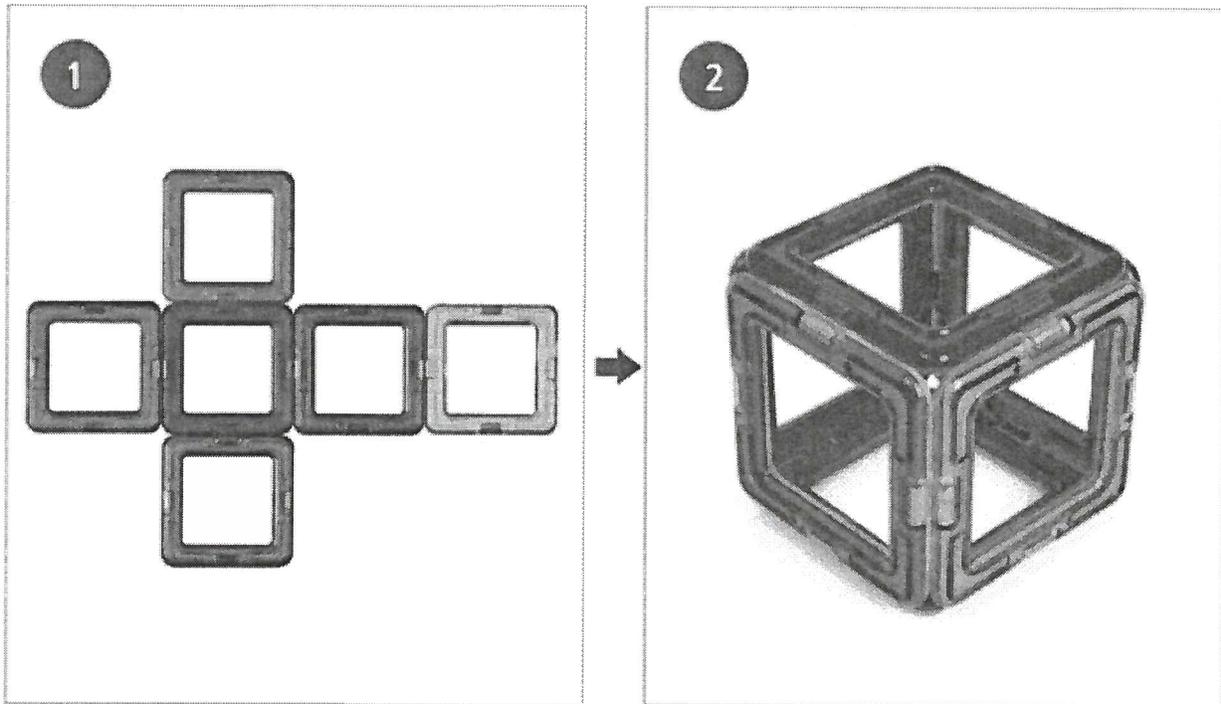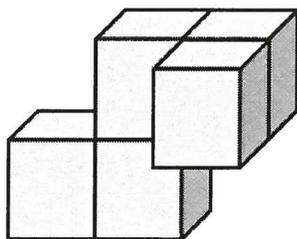## Part 2 – Net Diagrams and Magformers

Magformers are a magnetic toy that can be used to quickly construct Net Diagrams and fold them into three dimensional shapes.

Part 3 – Review of Surface Area and Volume

Q4: A composite shape is made up of five identical cubes, with side lengths of 1 unit. Determine its surface area and volume.

Surface Area

Top = 4
Bottom = 4
Right = 3
Left = 3
Front = 4
Back = 4
Total = 22 faces

Each face is $1 \times 1 = 1 cm^2$
So SA = $22 cm^2$

VOLUME

Each cube is $1 \times 1 \times 1 = 1 cm^3$
5 cubes
So Vol = $5 cm^3$

Math 10C   **KEY**

Q5: Using the Vernier Calipers, determine the measure of the five dimensions (labelled) of a single Math Cube. Give your measurements in <u>millimeters</u>, to the nearest tenth of a millimeter.
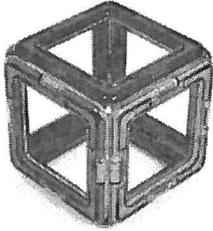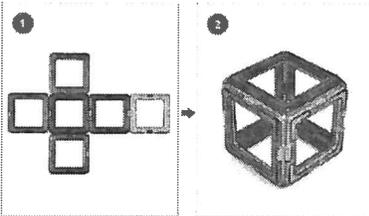
Math Cube   Top View   Side View

24.6
− 20.0
4.6 mm ⟹

8.1 mm

20.0 mm

24.6mm

19.9mm
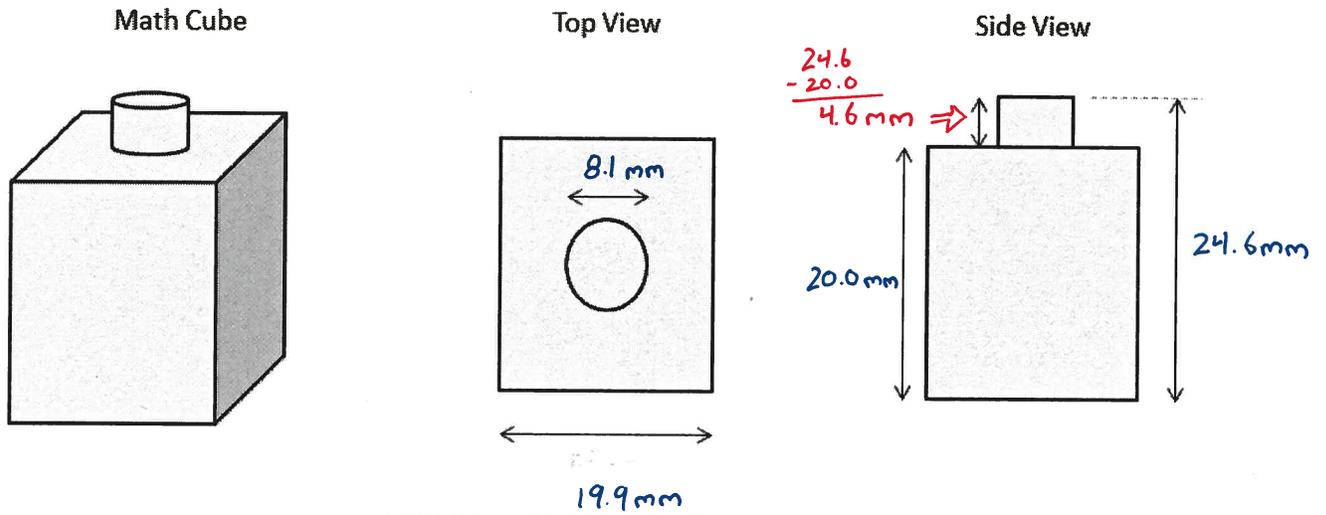
Measurements may vary.

Math 10C

KEY

Station #2 – Net Diagrams and Magformers

Q6: Create each of the following net diagrams (1), and fold them into their 3-D shape (2).

CUBE

□ › Square x6

① → ②

OCTAHEDRON

△ › Triangle x8

① → ②
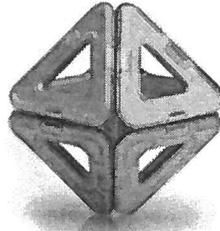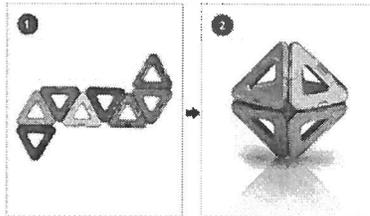
RHOMBICUBOCTAHEDRON (MAGIC BALL)
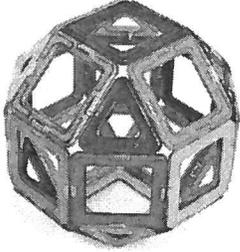
△ › Triangle x8
□ › Square x18

① → ②
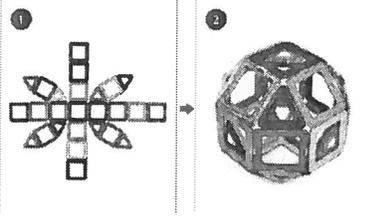
ICOSAHEDRON

△ › Triangle x20

① → ②

Math 10C

Key
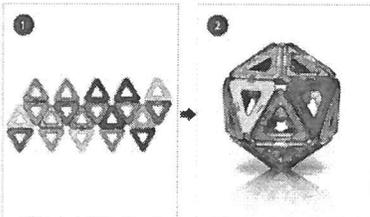
Q7: Use the Magformers to determine which of the following nets will successfully for a cube.

Yes

Yes

Yes

No

Yes

No

Yes

Yes

Yes

No
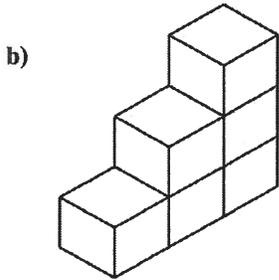
KEY
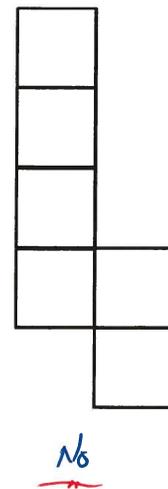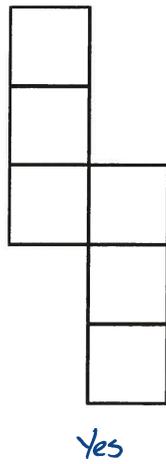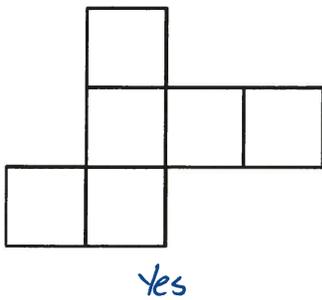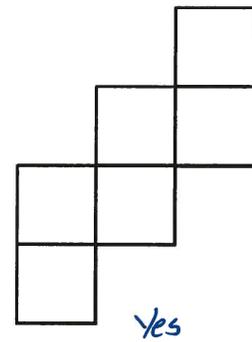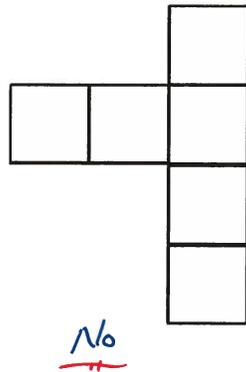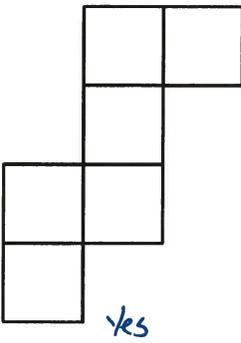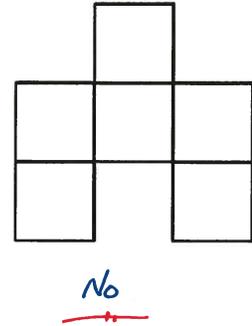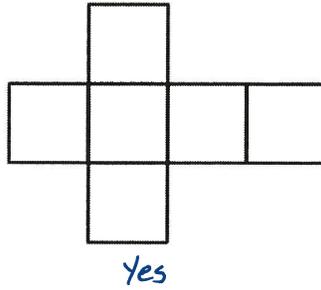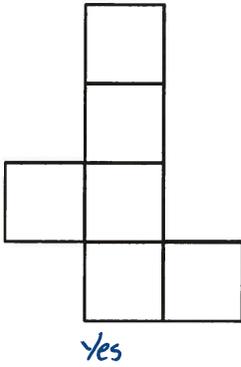
Q8: Using the Math Cubes, determine the surface area of the composite cubes. Each cube has sides of 1 unit.
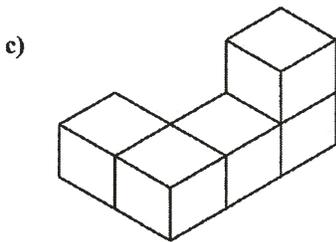
a)
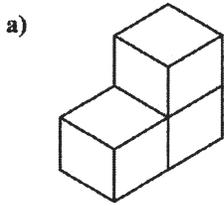
Top = 2
Bottom = 2
Front = 3
Back = 3
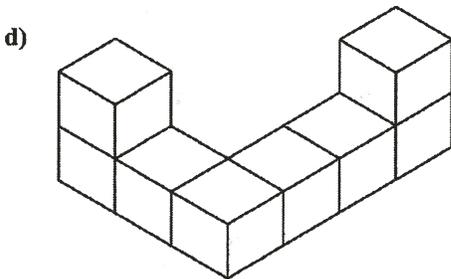Left = 2
Right = 2

Total = 14 unit^2

b)

Top = 3
Bottom = 3
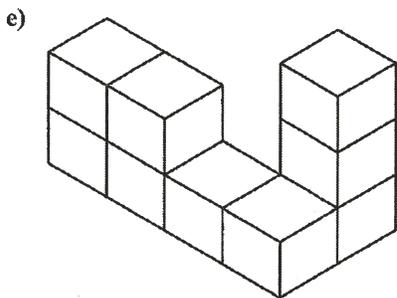Front = 6
Back = 6
Left = 3
Right = 3

SA = 24 unit^2

c)

Top = 4
Bottom = 4
Front = 4
Back = 4
Left = 3
Right = 3

SA = 22 unit^2

d)

Top = 6
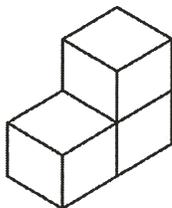Bottom = 6
Front = 6
Back = 6
Left = 5
Right = 5

SA = 34 unit^2

e)

Top = 5
Bottom = 5
Front = 5
Back = 5
Left = 8
Right = 8

SA = 36 unit^2

Math 10C

Station #5 – Volume

Q9: Using the Math Cubes, determine the volume of the composite cubes. Each cube has sides of 1 unit.

a)

$Vol = 3 \text{ unit}^3$
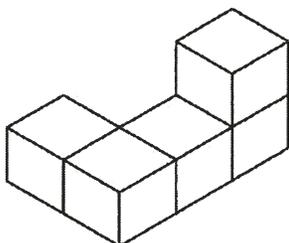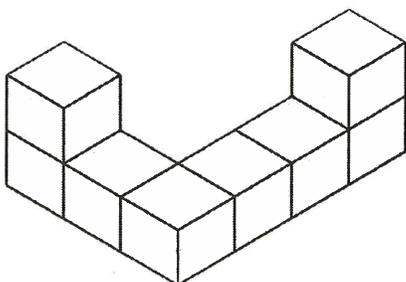
b)
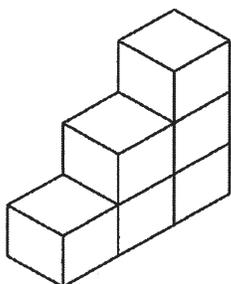
$Vol = 6 \text{ unit}^3$

c)

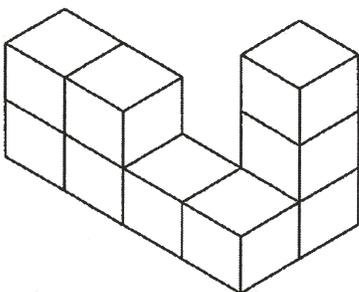$Vol = 5 \text{ unit}^3$

d)

$Vol = 8 \text{ unit}^3$

e)

$Vol = 9 \text{ unit}^3$

KEY

Station #6 – Brain Teasers
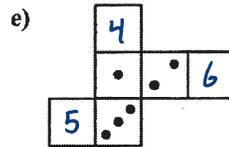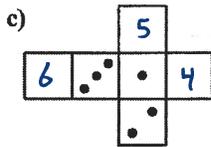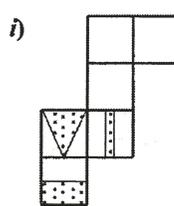
Q10: A die is a cube such that the top and bottom fo the die must add to seven. Complete the missing numbers.
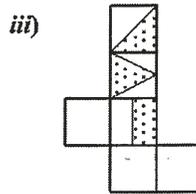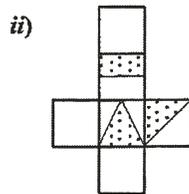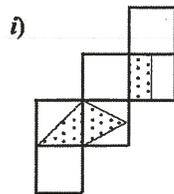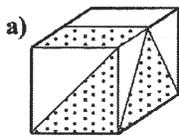
Example

a)

b)

c)

d)

e)

f)

g)
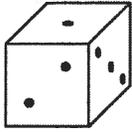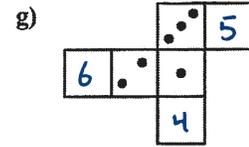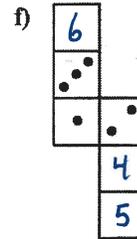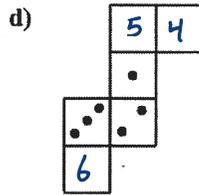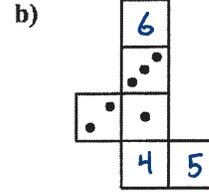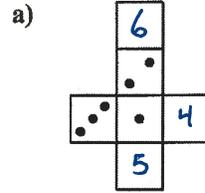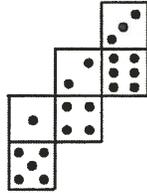
Q11: When unfolded, which figure represents the cube on the left?

a)

i) ii) iii) **iv)**

b)

i) ii) **iii)** iv)

KEY
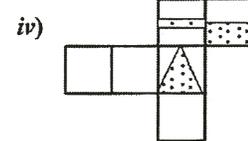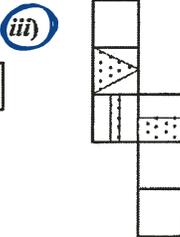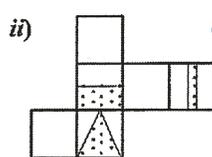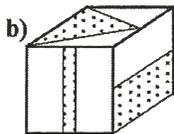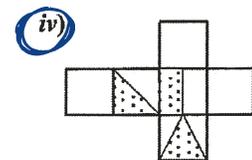
Q12: Which figure on the right will the unfolded cube become?

a)

i)   ii)   iii)

b)

i)   ii)   iii)

c)

i)   ii)   iii)