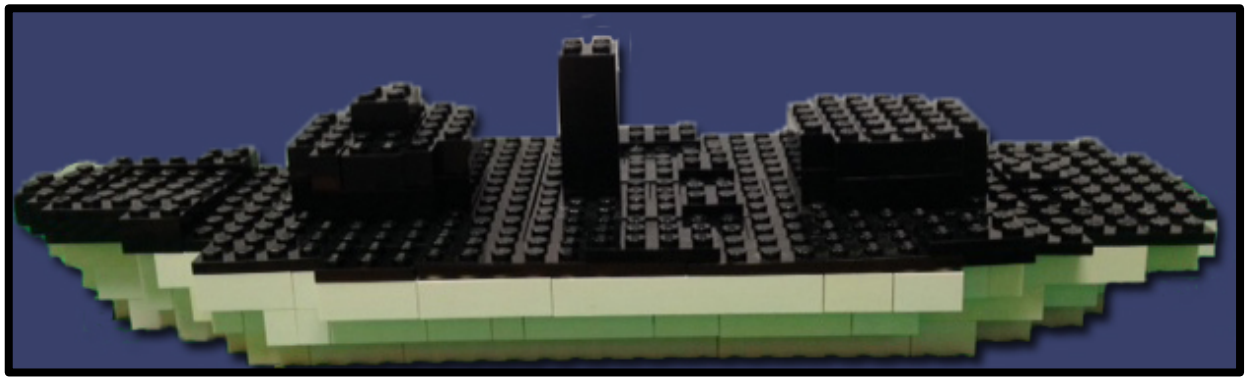
BRICK BY BRICK: LEGO® SHIPBUILDING

LEVEL: EXPERT (USS *ONONDAGA*)



BLACK, YELLOW, AND WHITE BRICKS ARE REQUIRED FOR THIS MODEL.

A Note on Dimension:
The instructions included for this ship model represent a new educational initiative by the Hampton Roads Naval Museum and the Naval Historical Foundation in order to promote STEM principles under the lens of naval history. When properly assembled, each graph (or Step) represents a layer of bricks built to resemble a design of a specific ship used in American naval history. Colors represent each specific layer of the vessel, from the keel to the top masts. Please note that the sizes and shapes represented in these instructions are squared. However, they are not to scale with LEGO brick sizes. They merely show the graphical placement locations of brick layers.

Ship Models included in this program are built with LEGO® bricks. LEGO® is a trademark of the LEGO Group of companies which does not sponsor, authorize, or endorse this program.

BRICK SUPPLY LIST

BRICKS	WHITE	YELLOW	BLACK
1x1	4	0	2
1x2	22	4	9
1x3	14	6	0
1x4	15	6	10
1x6	21	16	4
1x8	4	9	0
1x10	3	0	0
2x2	4	15	6
2x3	20	7	4
2x4	17	3	2
2x6	2	5	2
2x8	2	1	0
TOTALS	**128**	**72**	**39**

BRICKS	FLAT BRICKS		
2x2	0	0	9
2x3	0	0	13
2x4	0	0	17
2x6	0	0	9
2x8	0	0	4
2x10	0	0	1
2x12	0	0	2
TOTALS	**0**	**0**	**55**

TOTAL BRICKS: 294

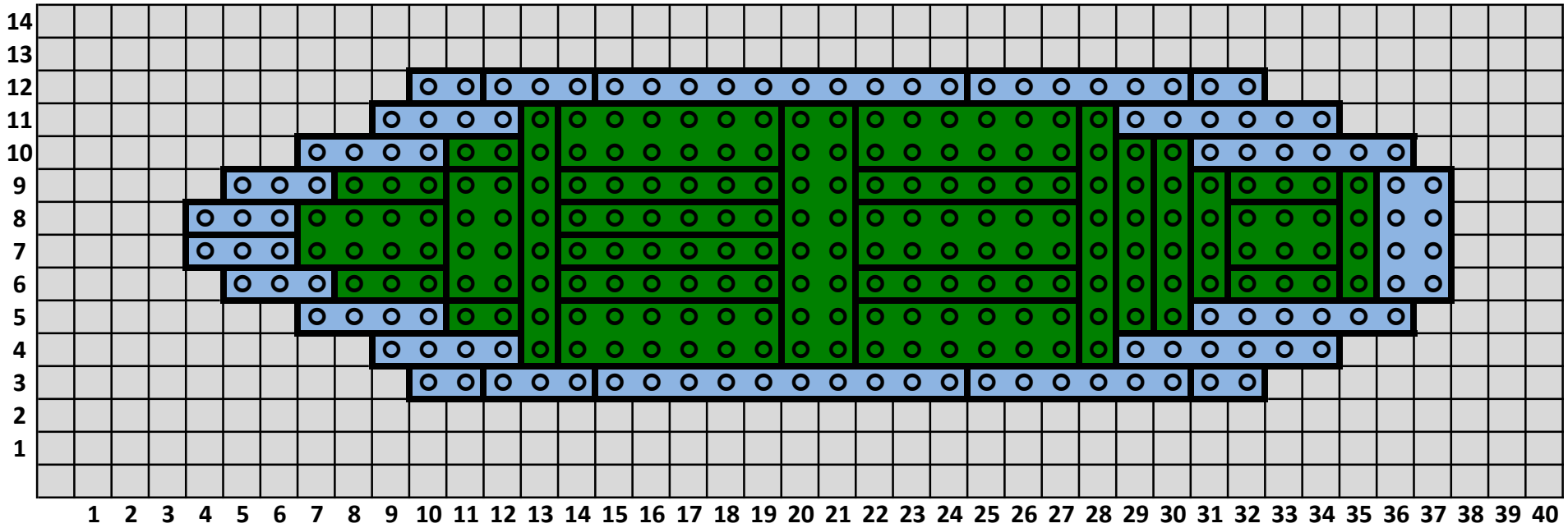
USS *Onondaga* Model

Instructions: Follow each step and layer the color-coded bricks on your building grid. Subsequent steps are layered on top of previous layers.

Step 1: Lay down the first layer

(White bricks shown in Blue)
(Yellow bricks shown in Green)

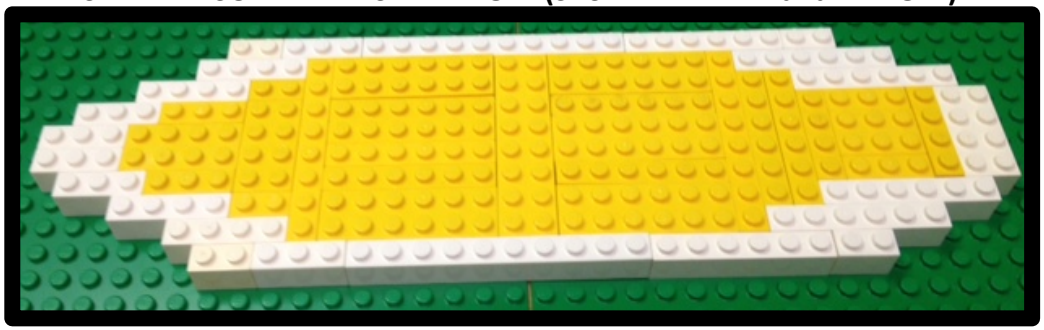
WHITE AND YELLOW BRICKS



For this step, you will need:

BRICKS	WHITE	YELLOW
1x2	4	2
1x3	6	4
1x4	4	2
1x6	6	8
1x8	2	2
1x10	2	0
2x3	0	1
2x4	1	2
2x6	0	5
2x8	0	1
TOTALS	**25**	**27**

STEP 1: VISUAL REPRESENTATION: (Shown in WHITE and YELLOW)



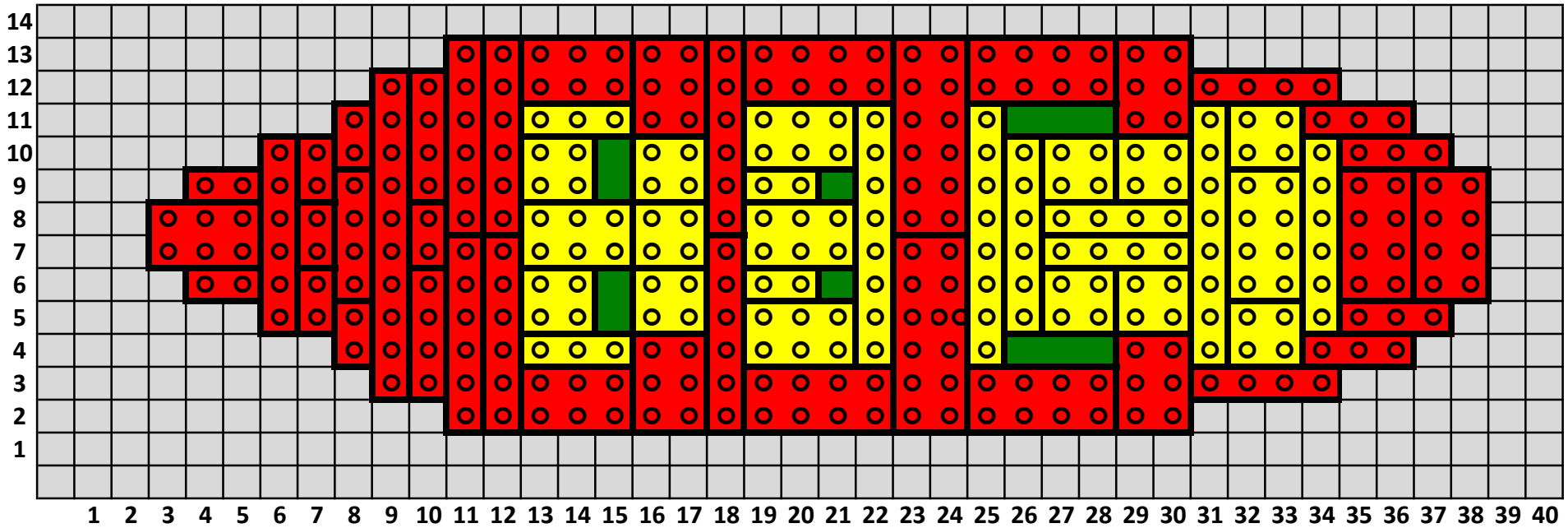
Above image represents actual brick color.

USS *Onondaga* Model

Step 2: Lay down the second layer

(White bricks shown in Red)
(Yellow bricks shown in Yellow)

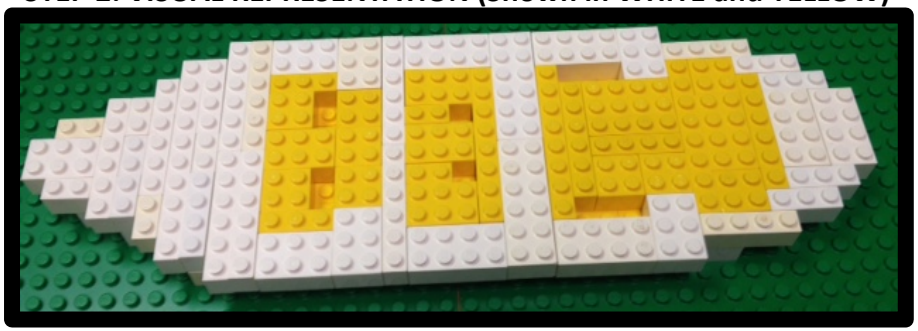
WHITE and YELLOW BRICKS



For this step, you will need:

BRICKS	WHITE	YELLOW
1x2	8	2
1x3	4	2
1x4	5	2
1x6	7	2
1x8	0	3
1x10	1	0
2x2	0	11
2x3	7	4
2x4	6	1
2x6	2	0
TOTALS	**40**	**27**

STEP 2: VISUAL REPRESENTATION (Shown in WHITE and YELLOW)



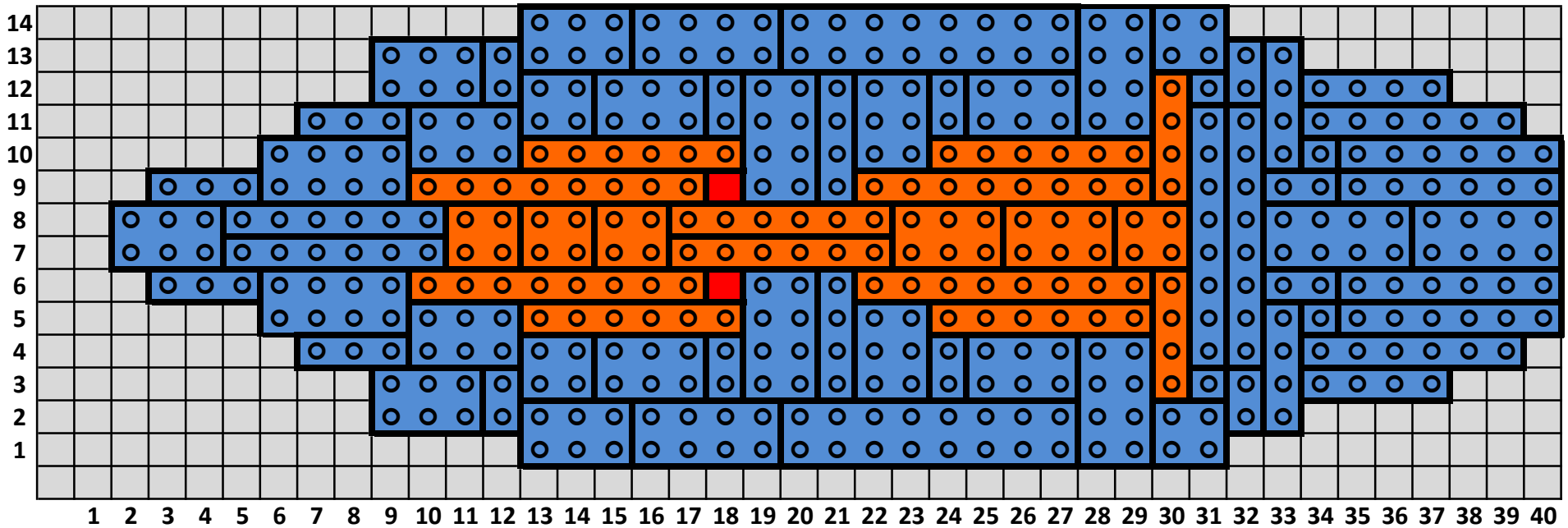
Above image represents actual brick color.

USS *Onondaga* Model

Step 3: Lay down the third layer

(White bricks shown in Blue)
(Yellow bricks shown in Orange)

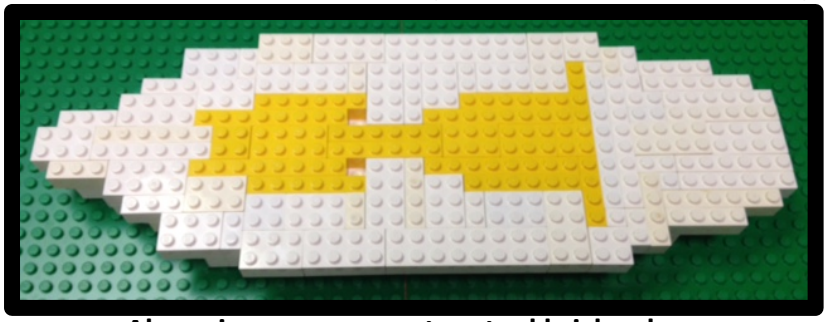
WHITE and YELLOW BRICKS



For this step, you will need:

BRICKS	WHITE	YELLOW
1x1	4	0
1x2	10	0
1x3	4	0
1x4	6	2
1x6	8	6
1x8	2	4
2x2	4	4
2x3	13	2
2x4	10	0
2x8	2	0
TOTALS	**63**	**18**

STEP 3: VISUAL REPRESENTATION (Shown in WHITE and YELLOW)

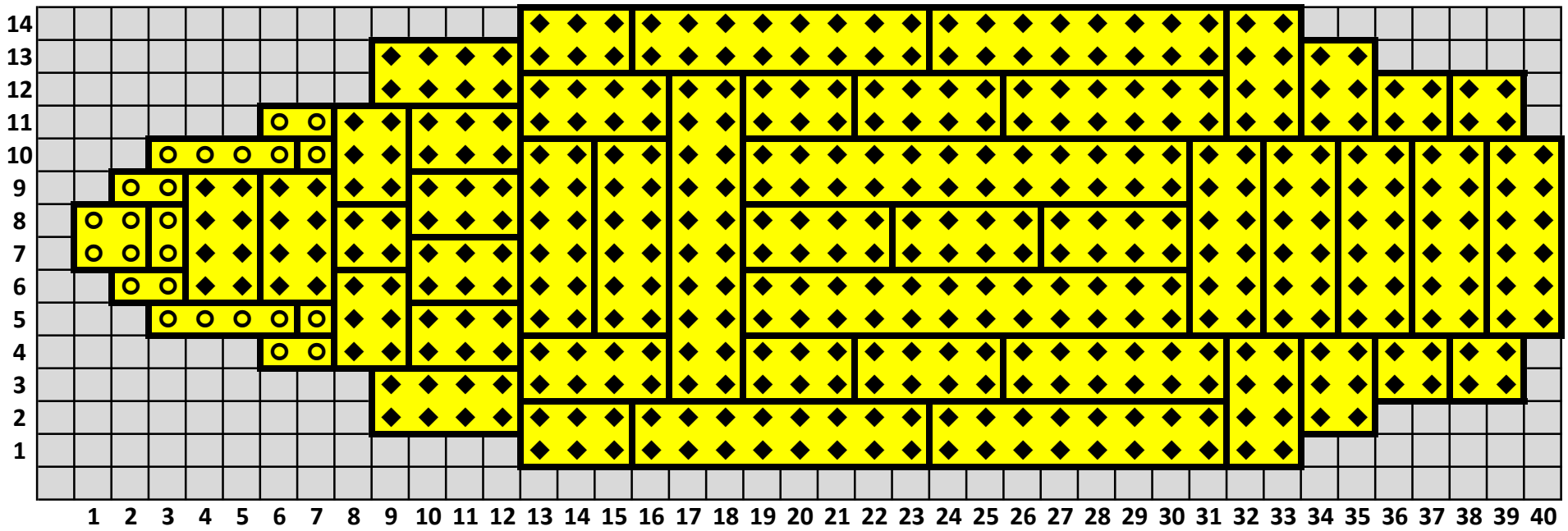


Above image represents actual brick color.

USS *Onondaga* Model

Step 4: Lay down the fourth layer (Black bricks shown in Yellow)

BLACK BRICKS

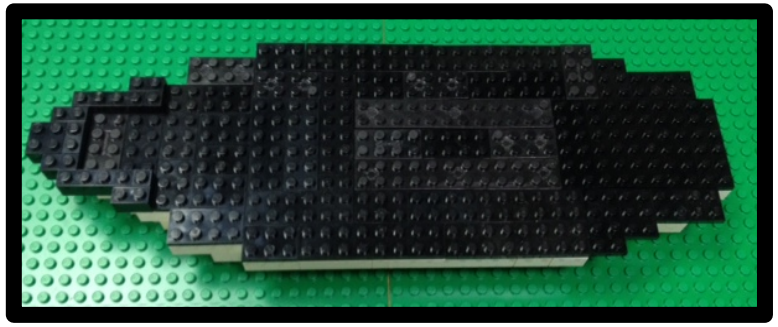


For this step, you will need:

◆ = **Flat Brick**

BRICKS	BLACK	
1x1	2	
1x2	5	
1x4	2	
2x2	1	
2x2	5	**FLAT**
2x3	12	**FLAT**
2x4	13	**FLAT**
2x6	9	**FLAT**
2x8	4	**FLAT**
2x10	1	**FLAT**
2x12	2	**FLAT**
TOTALS	**56**	

STEP 4: VISUAL REPRESENTATION (Shown in BLACK)

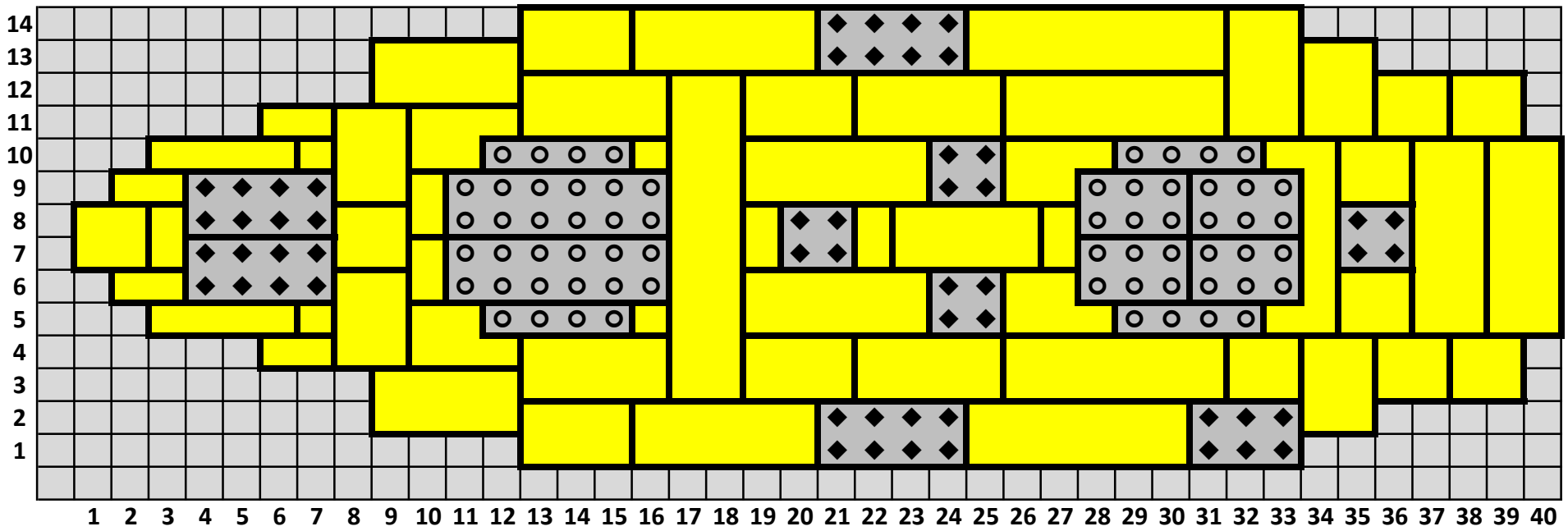


Above image represents actual brick color.

USS *Onondaga* Model

Step 5: Lay down the fifth layer (Black bricks shown in Gray)

BLACK BRICKS

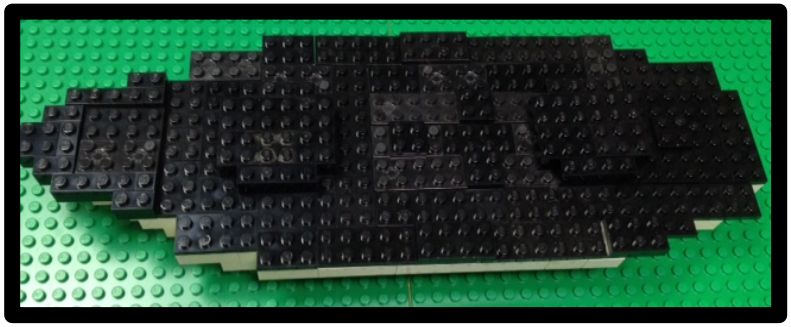


For this step, you will need:

◆ = **Flat Brick**

BRICKS	BLACK	
1x4	4	
2x3	4	
2x6	2	
2x2	4	**FLAT**
2x3	1	**FLAT**
2x4	4	**FLAT**
TOTALS	**19**	

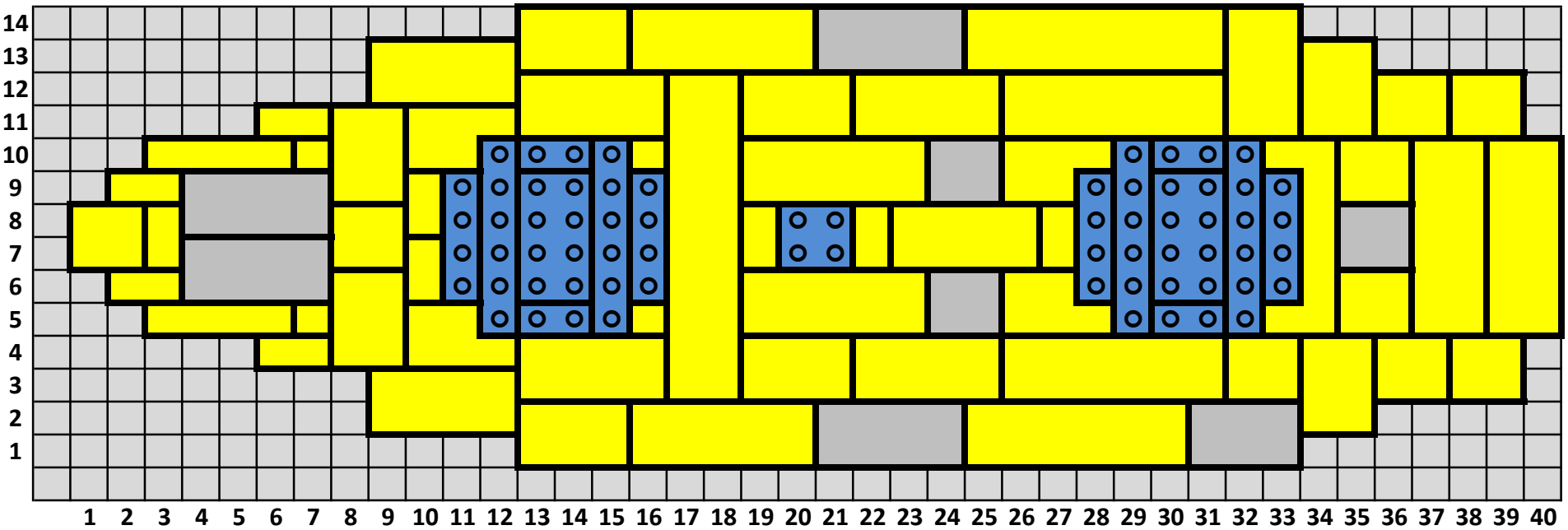
STEP 5: VISUAL REPRESENTATION (Shown in BLACK)



Above image represents actual brick color.

Step 6: Lay down the sixth layer (Black bricks shown in Blue)

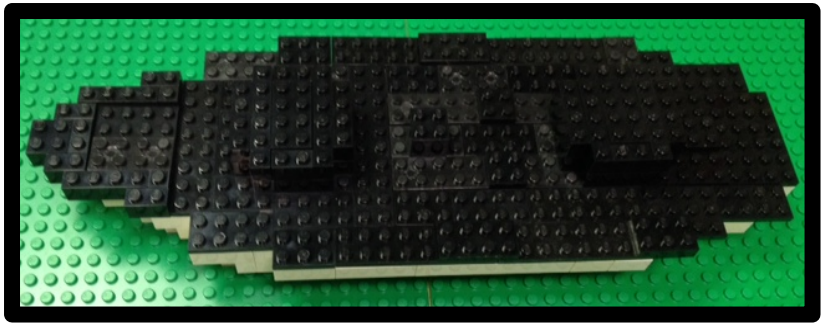
BLACK BRICKS



For this step, you will need:

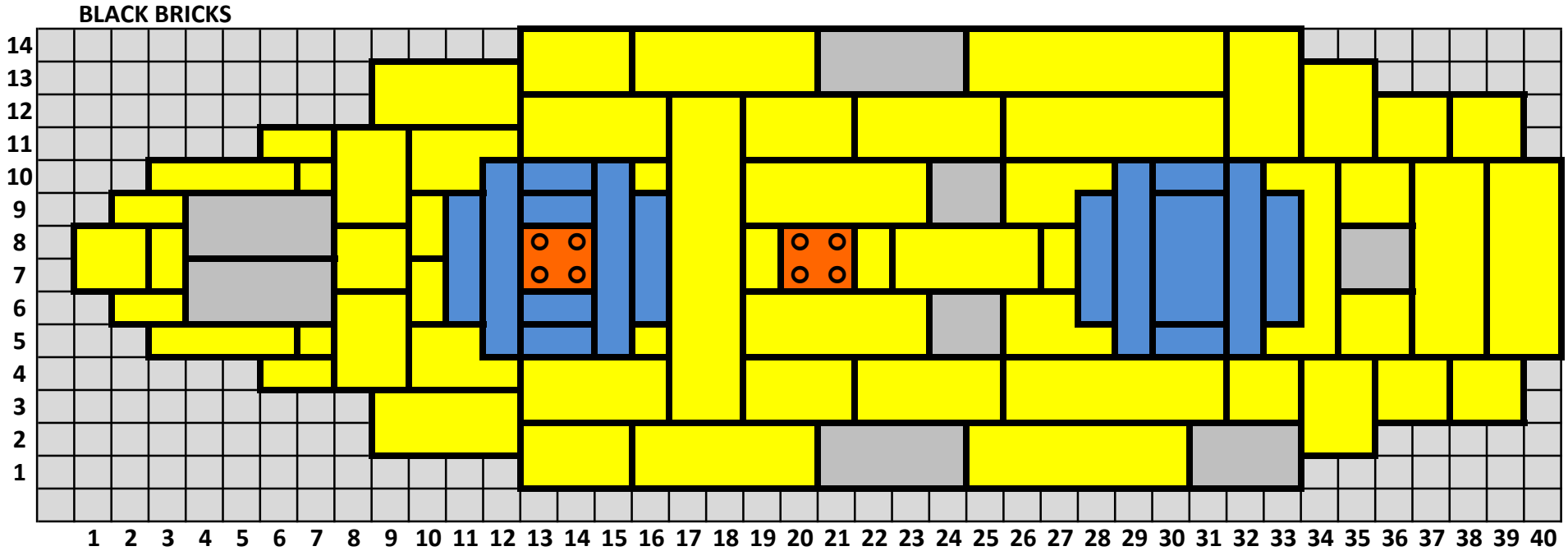
BRICKS	BLACK
1x2	4
1x4	4
1x6	4
2x2	1
2x4	2
TOTALS	**15**

STEP 6: VISUAL REPRESENTATION (Shown in BLACK)



Above image represents actual brick color.

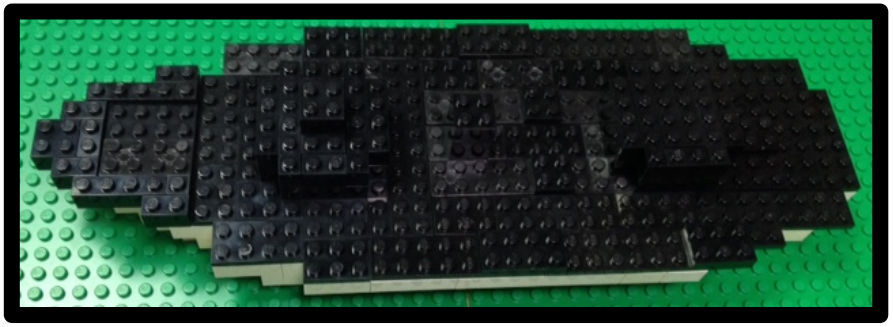
Step 7: Lay down the seventh layer (Black bricks shown in Orange)



For this step, you will need:

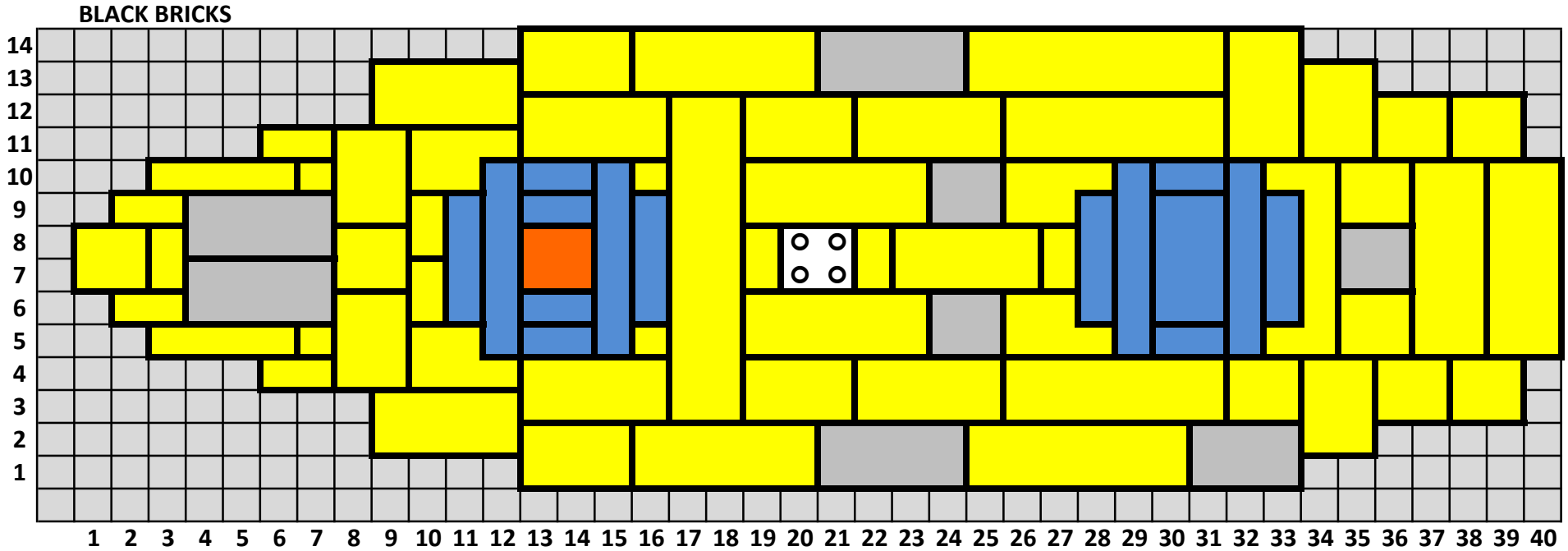
BRICKS	BLACK
2x2	2
TOTALS	**2**

STEP 7: VISUAL REPRESENTATION (Shown in BLACK)



Above image represents actual brick color.

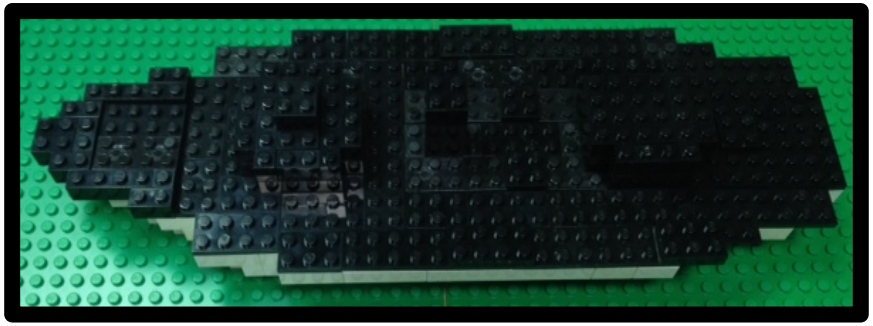
Step 8: Lay down the eigth layer (Black bricks shown in White)



For this step, you will need:

BRICKS	BLACK
2x2	1
TOTALS	**1**

STEP 8: VISUAL REPRESENTATION (Shown in BLACK)

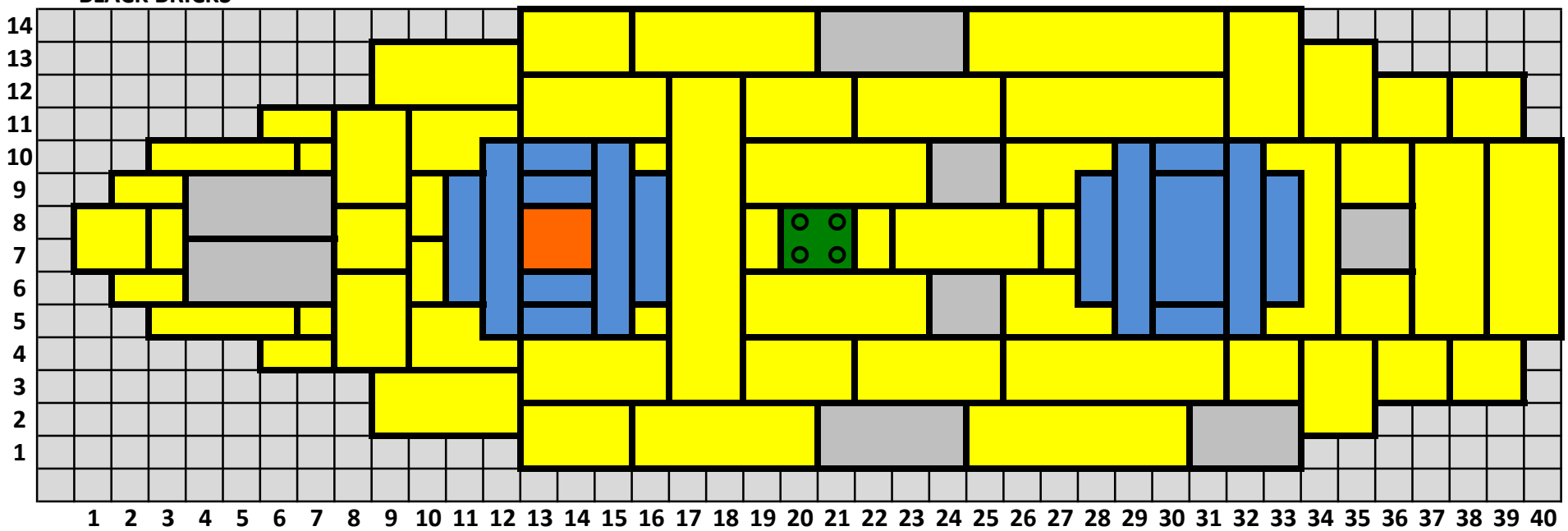


Above image represents actual brick color.

USS *Onondaga* Model

Step 9: Lay down the ninth layer (Black bricks shown in Green)

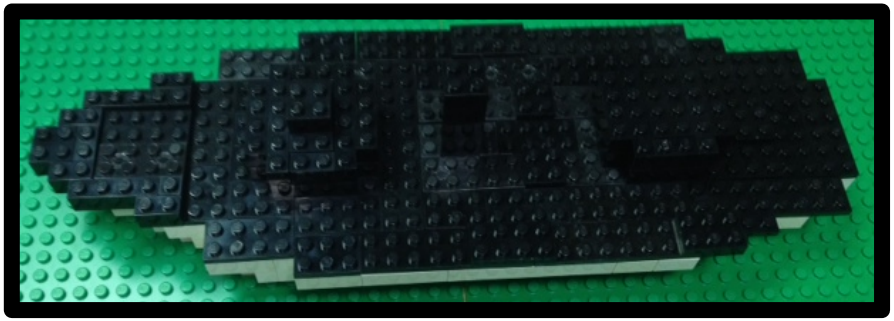
BLACK BRICKS



For this step, you will need:

BRICKS	BLACK
2x2	1
TOTALS	**1**

STEP 9: VISUAL REPRESENTATION (Shown in BLACK)



Above image represents actual brick color.