ACTIVITY: To Construct the Stern Section of the STEM Class Ship – Mega Block 1.

NOTES:
- Ensure optimal utilization of all materials to reduce waste.
- Ensure all cutting surfaces are protected when cutting materials with the use of a cutting board.

MATERIAL REQUIREMENTS:

- Sharpie
- Clear Ruler
- Exacto Knife
- Cutting Board
- Foam Board
- Black Plastic Sheets
- Scissors
- Glue Gun
- Canada Flag

DEFINITIONS AND ACRONYMS:

Definitions:
- Bulkhead - A dividing wall or barrier between compartments in a ship
- Deck – A structure approximately horizontal, extending across a ship
- Longitudinal – Situated along the length of the ship
- Port - The left side of the ship
- Shell - The outer most structure of a ship
- Starboard – The right side of the ship
- Stern - The back most part of the ship
- Transverse - Situated across the width of the ship

Acronyms:
- DWG - Drawing
- FWD - Forward
- LKG FWD - Looking Forward
- LKG DOWN – Looking Down
- LKG PORT – Looking Port
- PS – Port Side
- STBD – Starboard
- TYP - Typical, meaning the same on both sides
STEPS:

1. **Stern - Transverse Bulkhead**
   1.1 Using Attachment 1 (DWG No: A01-STERN PACKAGE-001) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.

2. **Stern – Longitudinal Bulkhead**
   2.1 Using Attachment 2 (DWG No: A01-STERN PACKAGE-002) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.

3. **Stern – Deck**
   3.1 Using Attachment 3 (DWG No: A01-STERN PACKAGE-003) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.

4. **Stern - Shell**
   4.1 Using Attachment 4 (DWG No: A01-STERN PACKAGE-004) follow the ‘NOTES’ section to mark-up, cut and fold Black Plastic Paper using Scissors to the exact measurements stipulated on the drawing.

5. **Stern – Assembly**
   5.1 Using Attachment 5 (DWG No: A01-STERN PACKAGE-005) follow the ‘NOTES’ section to assemble Transverse Bulkhead, Longitudinal Bulkhead, Deck & Shell to form Mega Block 1.
   5.2 Use glue gun to secure sections.

6. **Mast Assembly**
   6.1 Using Attachment 6 (DWG No: A01-STERN PACKAGE-006) measure, mark-up and cut Black Plastic Paper using Scissors to the exact measurements stipulated on the drawing.
   6.2 Follow the ‘NOTES’ section to create the circular section of the Mast.
   6.3 Assemble as per drawing and use glue gun to secure.
   6.4 Install Flag as per drawing.
ATTACHMENTS:

1 - DWG No: A01-STERN PACKAGE-001 Stern - Transverse Bulkhead Mega Block 1
2 - DWG No: A01-STERN PACKAGE-002 Stern – Longitudinal Bulkhead Mega Block 1
3 - DWG No: A01-STERN PACKAGE-003 Stern – Deck Mega Block 1
4 - DWG No: A01-STERN PACKAGE-004 Stern – Shell Mega Block 1
5 - DWG No: A01-STERN PACKAGE-005 Stern – Stern Assembly Mega Block 1
6 - DWG No: A01-STERN PACKAGE-006 Mast Assembly
ACTIVITY: To Construct Midship Section of a STEM Class Ship – Mega Block 2.

NOTES:
- Ensure optimal utilization of all materials to reduce waste.
- Ensure all cutting surfaces are protected when cutting materials with the use of a cutting board.
- Take note of the quantity required within the bill of materials section of the drawing attachments.

MATERIAL REQUIREMENTS:

Sharpie
Clear Ruler
Exacto Knife
Cutting Board
Foam Board
Black Plastic Sheets
Scissors
Glue Gun

DEFINITIONS AND ACRONYMS:

Definitions:
  Bulkhead - A dividing wall or barrier between compartments in a ship
  Deck – A structure approximately horizontal, extending across a ship
  Longitudinal – Situated along the length of the ship
  Port - The left side of the ship
  Shell - The outer most structure of a ship
  Starboard – The right side of the ship
  Stern - The back most part of the ship
  Transverse - situated across the width of the ship

Acronyms:
  DWG - Drawing
  FWD - Forward
  LKG FWD - Looking Forward
  LKG DOWN – Looking Down
  LKG PORT – Looking Port
  PS – Port Side
  STBD – Starboard
  TYP - Typical, meaning the same on both sides
STEPS:

1. **Midship – Transverse Bulkhead**
   
   1.1 Using Attachment 1 (DWG No: A01-MIDSHIP PACKAGE-001) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.
   1.2 Repeat step 1.1 to create a second Transverse Bulkhead section.

2. **Midship – Longitudinal Bulkhead**
   
   2.1 Using Attachment 2 (DWG No: A01-MIDSHIP PACKAGE-002) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.

3. **Midship – Deck**
   
   3.1 Using Attachment 3 (DWG No: A01-MIDSHIP PACKAGE-003) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.

4. **Midship - Shell**
   
   4.1 Using Attachment 4 (DWG No: A01-MIDSHIP PACKAGE-004) measure, mark-up and cut out section of Black Plastic Paper using Scissors, to the exact measurements stipulated on the drawing.
   4.2 Measure, mark-up and fold section of Black Plastic Paper to exact measurements stipulated on the drawing to form the shape indicated.

5. **Midship - Assembly**
   
   5.2 Using Attachment 5 (DWG No: A01-MIDSHIP PACKAGE-005) follow the ‘NOTES’ section to assemble Transverse Bulkhead, Longitudinal Bulkhead, Deck & Shell to form Mega Block 2.
   5.3 Use glue gun to secure sections.

6. **Superstructure Assembly**
   
   6.1 Using Attachment 6 (DWG No: A01-MIDSHIP PACKAGE-006) measure, mark-up and cut Black Plastic Paper using Scissors to the exact measurements stipulated on the drawing.
   6.2 Follow the ‘NOTES’ section to form the structure indicated on the drawing.
   6.3 Use glue gun to secure.
ATTACHMENTS:

1 - DWG No: A01-MIDSHIP PACKAGE-001 Midship – Transverse Bulkhead Mega Block 2
2 - DWG No: A01-MIDSHIP PACKAGE-002 Midship – Longitudinal Bulkhead Mega Block 2
3 - DWG No: A01-MIDSHIP PACKAGE-003 Midship – Deck Mega Block 2
4 - DWG No: A01-MIDSHIP PACKAGE-004 Midship – Shell Mega Block 2
5 - DWG No: A01-MIDSHIP PACKAGE-005 Midship – Midship Assembly Mega Block 2
6 - DWG No: A01-MIDSHIP PACKAGE-006 Superstructure Assembly
ACTIVITY: To Construct Bow Section of a STEM Class Ship – Mega Block 3.

NOTES:

- Ensure optimal utilization of all materials to reduce waste.
- Ensure all cutting surfaces are protected when cutting materials with the use of a cutting board.

MATERIAL REQUIREMENTS:

Sharpie
Clear Ruler
Exacto Knife
Cutting Board
Foam Board
Black Plastic Sheets
Scissors
Glue Gun

DEFINITIONS AND ACRONYMS:

Definitions:
- Bow - The forward most part of the ship
- Bulkhead - A dividing wall or barrier between compartments in a ship
- Curvature - Being curved or the degree to which something is curved
- Deck – A structure approximately horizontal, extending across a ship
- Longitudinal – Situated along the length of the ship
- Port - The left side of the ship
- Shell - The outer most structure of a ship
- Starboard – The right side of the ship
- Stern - The back most part of the ship
- Transverse - Situated across the width of the ship

Acronyms:
- DWG - Drawing
- FWD - Forward
- LKG FWD - Looking Forward
- LKG DOWN – Looking Down
- LKG PORT – Looking Port
- PS – Port Side
- STBD – Starboard
- TYP - Typical, meaning the same on both sides
STEPS:

1. Bow – Transverse Bulkhead
   1.1 Using Attachment 1 (DWG No: A01-BOW PACKAGE-001) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.

2. Bow – Longitudinal Bulkhead
   2.1 Using Attachment 2 (DWG No: A01-BOW PACKAGE-002) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.

3. Bow – Deck
   3.1 Using Attachment 3 (DWG No: A01-BOW PACKAGE-003) measure, mark-up and cut out section of Foam Board using an Exacto Knife to the exact measurements stipulated on the drawing.

4. Bow - Shell
   4.1 Using Attachment 4 (DWG No: A01-BOW PACKAGE-004) follow the ‘NOTES’ section to mark-up, fold and cut Black Plastic Paper using Scissors to the exact measurements stipulated on the drawing.
   4.2 Use Glue Gun to secure sections.

5. Bow - Assembly
   5.1 Using Attachment 5 (DWG No: A01-BOW PACKAGE-005) assemble Transverse Bulkhead, Longitudinal Bulkhead, Deck & Shell to form Mega Block 3.
   5.2 Use Glue Gun to secure sections.

ATTACHMENTS:

1 - DWG No: A01-BOW PACKAGE-001 Bow – Transverse Bulkhead Mega Block 3
2 - DWG No: A01-BOW PACKAGE-002 Bow – Longitudinal Bulkhead Mega Block 3
3 - DWG No: A01-BOW PACKAGE-003 Bow – Deck Mega Block 3
4 - DWG No: A01-BOW PACKAGE-004 Bow – Shell Mega Block 3
5 - DWG No: A01-BOW PACKAGE-005 Bow – Bow Assembly Mega Block 3
ACTIVITY: Final Assembly of the STEM Class Ship for the Royal Canadian Navy.

NOTES: Following Assembly ship will be launched.

MATERIAL REQUIREMENTS:

Clear Ruler  
Glue Gun  
Duct Tape  
Clothes Pins/Safety Pins

DEFINITIONS AND ACRONYMS:

Definitions:
Port - The left side of the ship
Super Structure: The parts of a Ship other than Mast, built above its Hull and Main Deck
Shell - The outer most structure of a ship
Mast – A long pole that rises vertically from a ship

Acronyms:
DWG - Drawing
LKG DOWN – Looking Down
LKG PORT – Looking Port
FWD – Forward

STEPS:

1. Assembly

1.1 Using Attachment 1 (A01-MEGA BLOCK PACKAGE-001) follow the ‘NOTES’ section to assemble STEM Class Ship 1.
1.2 Use Glue Gun to secure sections.
1.3 Use Duct Tape to seal edges.

ATTACHMENTS:

1 - DWG No: A01-MEGA BLOCK PACKAGE-001 Mega Block Join – Ship 1
SC-001 Manufacture and Assembly of the STEM Class Ship

Purpose: To Manufacture and Assemble a STEM Class Ship for the Royal Canadian Navy
Scope: This Process Applies to the STEM Class Program Only

Team 1
Future Shipbuilders

Start

SC-001-01
Perform
Construction of Mega Block 1

Team 2
Future Shipbuilders

SC-001-02
Perform
Construction of Mega Block 2

Team 3
Future Shipbuilders

SC-001-03
Perform
Construction of Mega Block 3

Teams 1, 2 & 3
Future Shipbuilders

SC-001-04
Perform
Final Assembly of the STEM Class

Conduct
Ship Launch

Conduct
Naming Ceremony

End
BILL OF MATERIALS

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<th>QUANTITY</th>
<th>MATERIAL DESCRIPTION</th>
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<tr>
<td>MIDSHIP - TRANSVERSE BULKHEAD</td>
<td>2</td>
<td>0.5CM THICK FOAM BOARD</td>
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NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
BILL OF MATERIALS

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<td>0.5CM THICK FOAM BOARD</td>
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NOTES:
T. ALL DIMENSIONS IN CENTIMETERS

LONGITUDINAL BULKHEAD

SECTION
LKG PORT
TOP
FWD

FABRICATION DRAWING
MIDSHIP-LONGITUDINAL BULKHEAD
MEGA BLOCK 2

IRVING SHIPBUILDING INC. ALL RIGHTS RESERVED

REV
DWG NO
SHEET
UNITS
DWN
CHK
SCALE
DATE
SIZE
STEM
CLASS
SHIP 1
BILL OF MATERIALS

<table>
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NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
A1
2345678910
12
A
B
C
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C
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F
G
H
12345678910
11
12
IZ 
IRVING SHIPBUILDING INC. ALL RIGHTS RESERVED
REV DWG NO
SHEET
UNITS
DWNCHK
SCALE
DATE
SIZE
STEM
CLASS
SHIP 1
FABRICATION DRAWING
MIDSHIP-SHELL
MEGA BLOCK 2
K. JACKMANK. BANKS
MILLIMETERS
NTSD

BILL OF MATERIALS
NAME
QUANTITY
MATERIAL DESCRIPTION
MIDSHIP - SHELL
1
21.5X28CM BLACK PLASTIC PAPER

NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
2. DRAW AND FOLD ALONG FOLD LINES

PLAN VIEW 2
LKG DOWN
FWD

3D VIEW

FOLD

20

2.150

4.92YP

7.75YP

PORT

NAME
QUANTITY
MATERIAL DESCRIPTION
MIDSHIP - SHELL
1
21.5X28CM BLACK PLASTIC PAPER

NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
2. DRAW AND FOLD ALONG FOLD LINES

PLAN VIEW 2
LKG DOWN
FWD

3D VIEW

FOLD

20

2.150

4.92YP

7.75YP

PORT
1. ALL DIMENSIONS IN CENTIMETERS
2. INSTALL TRANSVERSE AND LONGITUDINAL BULKHEADS ONTO THE SHELL AS SHOWN IN PLAN VIEW 1.
3. INSTALL DECK ON TOP AS SHOWN IN PLAN VIEW 2.

3D VIEW
(DECK NOT SHOWN FOR CLARITY)
1. ALL DIMENSIONS IN CENTIMETERS
2. FOLD ALONG FOLD LINES, AND CUT SECTIONS AS SHOWN.
3. ONCE FOLDING AND CUTTING IS COMPLETE, BRING THE ORANGE CIRCLES TOGETHER WITH THE MIDDLE SECTION INSIDE.
4. BRING THE BLUE CIRCLES TOGETHER, WITH THE INNER TRIANGLES ON THE INSIDE AS INDICATED. DO THE SAME WITH THE OTHER SIDE (PINK CIRCLES).

BILL OF MATERIALS

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<tr>
<th>NAME</th>
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NOTES:

NAME | QUANTITY | MATERIAL DESCRIPTION
SUPERSTRUCTURE | 1 | 21.5X28CM BLACK PLASTIC PAPER
NOTES:
1. ALL DIMENSIONS IN CENTIMETERS

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<tr>
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<td>0.5CM THICK FOAM BOARD</td>
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</tbody>
</table>

TRANSVERSE BULKHEAD

SECTION
LKG FWD

TOP
PS

FABRICATION DRAWING
STERN - TRANSVERSE BULKHEAD
MEGA BLOCK 1

2018-10-29
A01-STERN PACKAGE-001

NAME
STERN - TRANSVERSE BULKHEAD

QUANTITY
1

MATERIAL
0.5CM THICK FOAM BOARD
NOTES:
1. ALL DIMENSIONS IN CENTIMETERS

BILL OF MATERIALS

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<th>NAME</th>
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<tbody>
<tr>
<td>STERN - DECK</td>
<td>1</td>
<td>0.5CM THICK FOAM BOARD</td>
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FABRICATION DRAWING
STERN - DECK
MEGA BLOCK 1
K. JACKMAN
C.BANKS
MILLIMETERS

NOTES:
1. ALL DIMENSIONS IN CENTIMETERS

DECK

PLAN VIEW
LKG DOWN  FWD

CUT OUT
NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
2. FIRST DRAW ALL THE FOLD LINES AS SHOWN IN PLAN VIEW 1, DO NOT FOLD YET.
3. CUT ALONG THE LINES SHOWN IN PLAN VIEW 2.
4. MARK AN X IN THE CENTER OF THE THREE END SECTIONS.
5. FOLD ALONG THE FOLD LINES.
6. BRING THE END SECTIONS TOGETHER SO THAT THE X'S ALL OVERLAP, WITH THE MIDDLE SECTION ON THE INSIDE.

BILL OF MATERIALS

<table>
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<th>NAME</th>
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<tbody>
<tr>
<td>STERN - SHELL</td>
<td>1</td>
<td>21.5X28CM BLACK PLASTIC PAPER</td>
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</table>

FABRICATION DRAWING

STERN - SHELL
MEGA BLOCK 1

K. JACKMAN
C.BANKS

REV
DWG NO
SHEET
UNITS
DWN
CHK
SCALE
DATE
SIZE

NAME: STERN - SHELL
QUANTITY: 1
MATERIAL DESCRIPTION: 21.5X28CM BLACK PLASTIC PAPER

PLANS VIEW 1
LKG DOWN
FWD

PLANS VIEW 2
LKG DOWN
FWD

3D VIEW
A01-STERN PACKAGE-005

NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
2. INSTALL TRANSVERSE AND LONGITUDINAL BULKHEADS ONTO THE SHELL AS SHOWN IN PLAN VIEW 1.
3. INSTALL DECK ON TOP AS SHOWN IN PLAN VIEW 2.

3D VIEW
(DECK NOT SHOWN FOR CLARITY)
NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
2. ROLL THE PAPER OVERLAPPING THE BLACK DOTS.
3. USE ROLLED PAPER TO TRACE A CIRCLE FOR THE TOP.
4. INSTALL FLAG ON TOP.

<table>
<thead>
<tr>
<th>NAME</th>
<th>QUANTITY</th>
<th>MATERIAL DESCRIPTION</th>
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<tbody>
<tr>
<td>MAST</td>
<td>1</td>
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NOTES:
1. ALL DIMENSIONS IN CENTIMETERS.
NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
3D VIEW

NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
2. DRAW FOLD LINES AND CUT LINES.
3. CUT ALONG CUT LINE.
4. BRING THE CORNERS MARKED WITH A CIRCLE TOGETHER TO OVERLAP, WITH THE MIDDLE SECTION, THE MIDDLE SECTION SHOULD BE ON THE OUTSIDE. STAPLE THESE 3 POINTS TOGETHER FIRST, THEN GLUE.

BILL OF MATERIALS

<table>
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<tr>
<th>NAME</th>
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<tr>
<td>BOW - SHELL</td>
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NAME                  QUANTITY MATERIAL DESCRIPTION
BOW - SHELL            1                         21.5X28CM BLACK PLASTIC PAPER

PLAN VIEW 1
UNFOLDED
LKG DOWN
PORT
FWD

PLAN VIEW 2
UNFOLDED
LKG DOWN
PORT
FWD

FOLDED LENGTH ~17
NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
2. TRIM BOTTOM PART OF BULKHEADS TO SUIT CURVATURE OF THE SHELL IF NEEDED.
3. TRIM THE DECK TO SUIT THE CURVATURE OF THE SHELL.

3D VIEW
(Deck not shown for clarity)
NOTES:
1. ALL DIMENSIONS IN CENTIMETERS
2. OVERLAP THE MEGA BLOCK SHELLS TO GET A FULL SHIP LENGTH OF 50CM. OVERLAPS ARE APPROXIMATELY 2CM.
3. MAY NEED TO TRIM DECKS AND OR LONGITUDINAL BULKHEADS TO FIT MEGA BLOCKS TOGETHER.
4. DO NOT GLUE THE SUPERSTRUCTURE ON, LIGHTLY TAPE IT. YOU WILL NEED TO BE ABLE TO REMOVE THE SUPERSTRUCTURE TO ADD WEIGHT INSIDE.

PLAN VIEW
LKG DOWN

SECTION
LKG PORT

SUPERSTRUCTURE

MEGA BLOCK 1

MEGA BLOCK 2

MEGA BLOCK 3

~2

~2

10

FWD