

Lesson Title: **Ramp Design**

Lesson Topic: Building and Design

Curricular Integration: [Visual Art](#), [Mathematics](#)

### Minds On

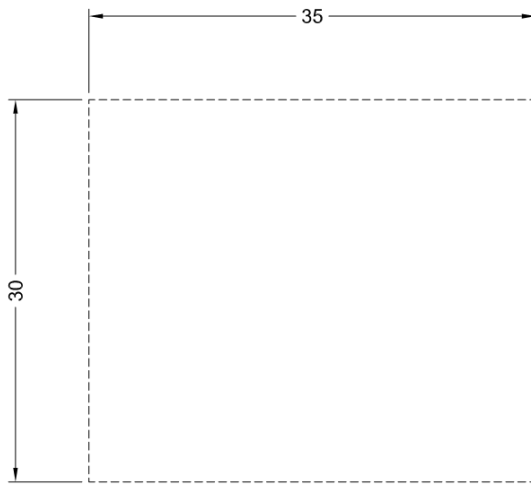
What ways can we raise awareness about issues that exist in our communities?

Check out the Good Bike Project - <https://vimeo.com/91736716>. This project helped inspire the StopGap Ramp Project by introducing how painting a simple object a bright colour can draw attention to that object.

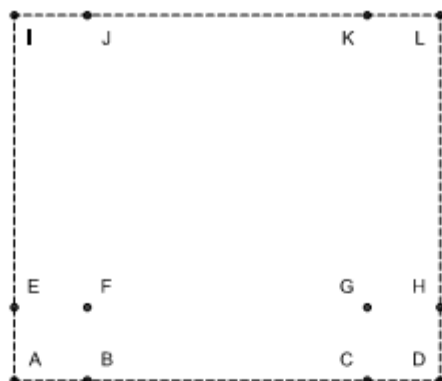
We can also raise awareness about the things that we love in our communities. Here's a really amazing initiative called The Love Lettering Project - <https://www.youtube.com/watch?v=IPRg0VROf-E>. The Love Lettering Project is a community engagement project that asks participants to write letters about what they love about where they live.

### Working On It

Each student will build a model ramp, and depending on the grade we've provided a number of options. A simple ramp (triangular prism) design and construction process is detailed below. In the Teacher Resources and Links section, we've provided more advanced designs incorporating trigonometry and a simple 3-4-5 triangle design, both involve algebraic formulae. We suggest using pizza boxes or other reusable materials to build these ramps.



STEP 1:  
USING CARDBOARD, MEASURE AND CUT OUT A 30cm x 35cm RECTANGLE.



**STEP 2:**  
MARK AND LABEL POINT 'A' ON THE BOTTOM LEFT CORNER OF THE RECTANGLE.

**STEP 3:**  
FROM POINT 'A' MEASURE 6cm ALONG THE BOTTOM EDGE TO THE RIGHT, PUT A MARK HERE AND LABEL IT POINT 'B'.

**STEP 4:**  
MARK AND LABEL POINT 'D' ON THE BOTTOM RIGHT CORNER OF THE RECTANGLE.

**STEP 5:**  
FROM POINT 'D' MEASURE 6cm ALONG THE BOTTOM EDGE TO THE LEFT, PUT A MARK HERE AND LABEL IT POINT 'C'.

**STEP 6:**  
FROM POINT 'A' MEASURE 6cm UPWARDS ALONG THE LEFT SIDE, PUT A MARK HERE AND LABEL IT POINT 'E'.

**STEP 7:**  
FROM POINT 'E' MEASURE 6cm TO THE RIGHT, PUT A MARK HERE AND LABEL IT POINT 'F'.

**STEP 8:**  
MAKE SURE THAT POINT 'F' IS 6cm UPWARDS FROM POINT 'B'.

**STEP 9:** FROM POINT 'D' MEASURE 6cm UPWARDS ALONG THE RIGHT SIDE, PUT A MARK HERE AND LABEL IT POINT 'H'.

**STEP 9:**  
FROM POINT 'H' MEASURE 6cm TO THE LEFT, PUT A MARK HERE AND LABEL IT POINT 'G'.

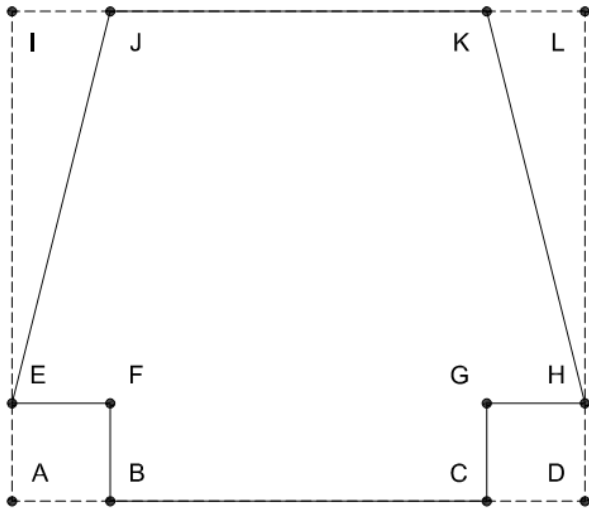
**STEP 10:**  
MAKE SURE THAT POINT 'G' IS 6cm UPWARDS FROM POINT 'C'.

**STEP 11:**  
MARK AND LABEL POINT 'I' ON THE TOP LEFT CORNER OF THE RECTANGLE.

**STEP 12:**  
FROM POINT 'I' MEASURE 6cm ALONG THE TOP EDGE TO THE RIGHT, PUT A MARK HERE AND LABEL IT POINT 'J'.

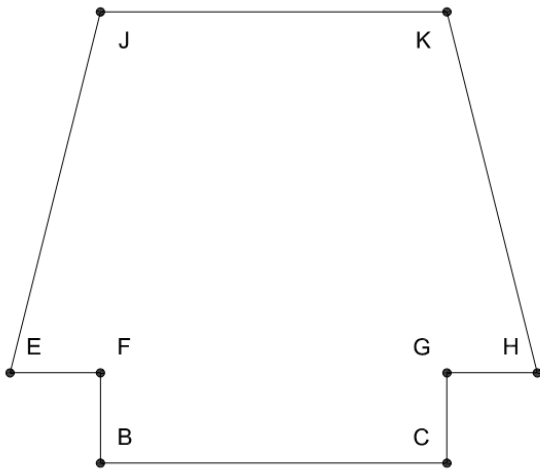
**STEP 13:**  
MARK AND LABEL POINT 'L' ON THE TOP RIGHT CORNER OF THE RECTANGLE.

**STEP 14:**  
FROM POINT 'L' MEASURE 6cm ALONG THE TOP EDGE TO THE LEFT, PUT A MARK HERE AND LABEL IT POINT 'K'.

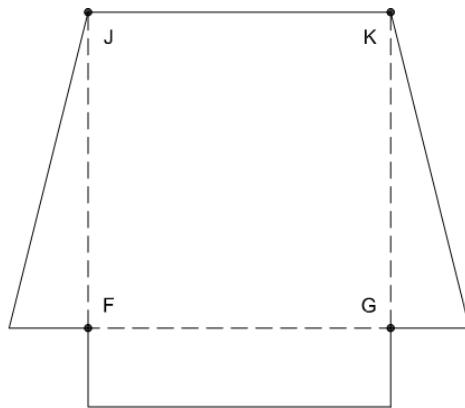


STEP 15:  
DRAW LINES BETWEEN THE FOLLOWING POINTS:

- POINT 'E' AND POINT 'F'
- POINT 'B' AND POINT 'F'
- POINT 'E' AND POINT 'J'
- POINT 'G' AND POINT 'H'
- POINT 'C' AND POINT 'G'
- POINT 'H' AND POINT 'K'



STEP 16:  
CUT CAREFULLY ALONG THE LINES YOU MADE IN THE PREVIOUS STEP.



**STEP 17:**  
 USING A CONSTRUCTION KNIFE AND A STRAIGHT EDGE, CUT HALFWAY THROUGH THE CARDBOARD BETWEEN THE FOLLOWING POINTS:  
 - POINT 'F' AND POINT 'J'  
 - POINT 'G' AND POINT 'K'  
 - POINT 'F' AND POINT 'G'

**STEP 18:**  
 FOLD ALONG THE CUT LINES THAT YOU MADE IN THE PREVIOUS STEP.

**STEP 19:**  
 USE MASKING TAPE ALONG THE EDGES THAT MEET ON THE INSIDE OF YOUR RAMP CREATION!

After the ramps are built, students can decorate them! You may decide to set up stations with different materials that students can use to make their ramps unique (paints, fabrics, markers, magazines and other collage materials, etc.)

Students could use this opportunity to display the new access logos they created in the \*Sticker Campaign lesson, or they might decide to decorate their ramp in a way that best represents their abilities, like a self-portrait of their strengths!

Display your decorated ramps around your classroom! They will make great decorations for your celebration!

Perhaps some students would like to present and discuss their ramp designs; How does your ramp design represent accessibility and/or draw attention to accessibility issues?

### Reflection/Application

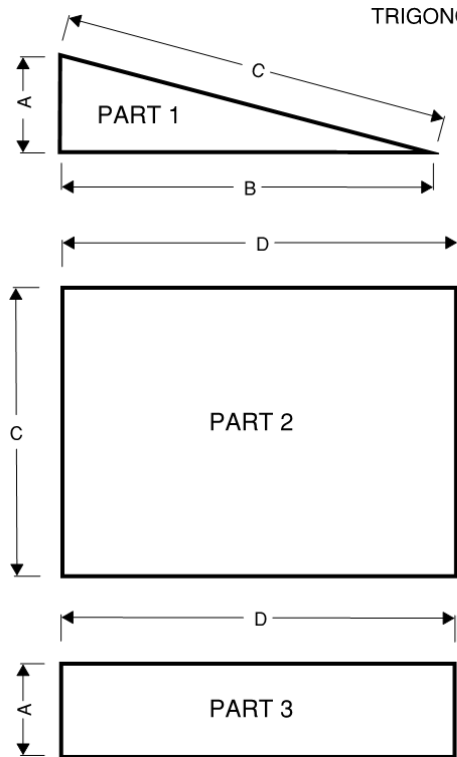
Did you run into any problems during your ramp building?

How did you problem solve?

Once you have someone's attention, then what? How do you deliver your awareness raising message?

**Teacher Resources and Links**

\*See the Sticker Campaign lesson available in our alternative lesson plan section for decoration ideas.



**TRIGONOMETRY DESIGN**

STEP 1:  
CHOOSE A MEASUREMENT BETWEEN 5 cm AND 10 cm  
FOR 'X' AND CALCULATE 'A', 'B', & 'C' MEASUREMENTS

$X = \text{BETWEEN 5 TO 10 cm}$

$A = X$

$B = X \times 5$

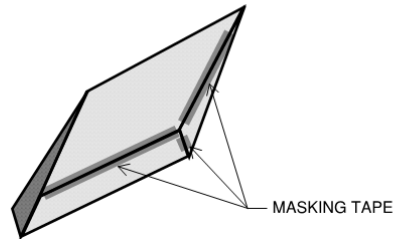
$C = \sqrt{A^2 + B^2}$

$D = 45 \text{ cm}$

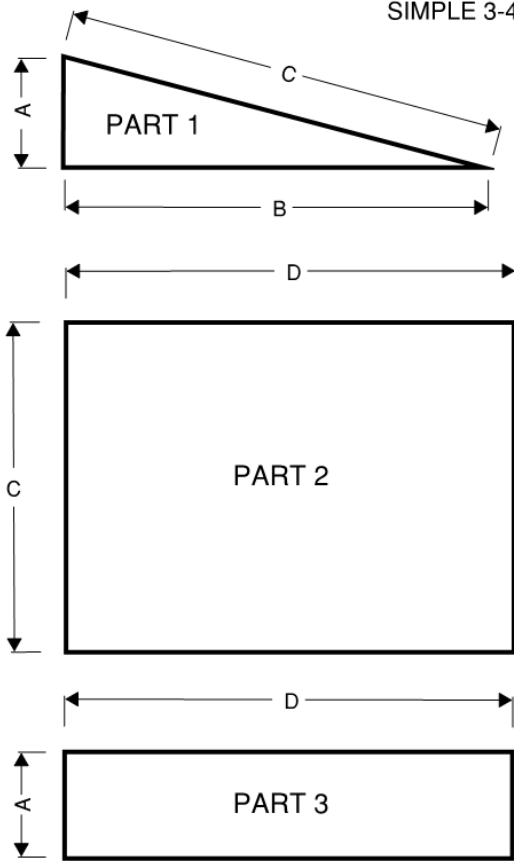
STEP 2:  
LAYOUT AND CUT OUT TWO 'PART 1' PIECES

STEP 3:  
LAYOUT AND CUT 'PART 2' AND 'PART 3'

STEP 4:  
USING MASKING TAPE, ASSEMBLE PARTS BY  
CONNECTING INSIDE ADJOINING EDGES



**SIMPLE 3-4-5 TRIANGLE DESIGN**



STEP 1:  
CHOOSE A MEASUREMENT BETWEEN 5 cm AND 10 cm  
FOR 'X' AND CALCULATE 'A', 'B', & 'C' MEASUREMENTS

X = BETWEEN 5 TO 10 cm

A = X x 3

B = X x 4

C = X x 5

D = 45 cm

STEP 2:  
LAYOUT AND CUT OUT TWO 'PART 1' PIECES

STEP 3:  
LAYOUT AND CUT 'PART 2' AND 'PART 3'

STEP 4:  
USING MASKING TAPE, ASSEMBLE PARTS BY  
CONNECTING INSIDE ADJOINING EDGES

