ACTIVITY 22

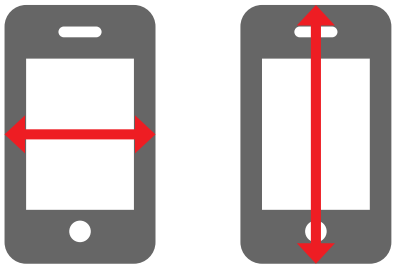
BUILDING A VR VIEWER
COMPLETE BUILD ASSEMBLY

MATERIALS NEEDED

- One Rectangular Cardboard piece from 12-pack soda case
- Two round bi-convex lenses with a focal point of 45mm and a diameter of 25mm
- Hot glue gun and glue
- Scissors
- Masking tape
- 2 thick rubber bands

ASSEMBLY INSTRUCTIONS PART 1: MATH AND MEASUREMENTS

1. Measure the Vertical Length and Horizontal Width



HORIZONTAL WIDTH

_____ CM

VERTICAL LENGTH

_____ CM

2. Divide your Horizontal Width and Vertical Length measurements by 2. Measurement "a" and "b" will be used in other calculations and constructions.

A = VERTICAL LENGTH ÷ 2 = _____ CM

B = HORIZONTAL WIDTH ÷ 2 = _____ CM

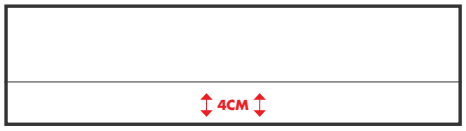
3. Your VR viewer's faceplate will be oval shaped. To make a piece of cardboard long enough, you need to calculate the approximate Perimeter of an oval big enough to cover your phone's screen. Substitute your given information from step #2 and 3.14 for π into the formula below. Calculate the Perimeter and check your work, rounding your answer to the nearest tenth.

$$\text{PERIMETER} = 2\pi\sqrt{\frac{A^2+B^2}{2}}$$

FACEPLATE PERIMETER OF OVAL FACEPLATE = _____ CM

PART 2: LOOP CONSTRUCTION

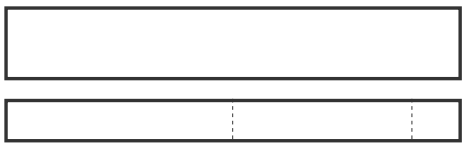
1. Draw a straight line that is 4 cm away from the long edge of your cardboard.



2. Draw one line from a small end that is the same distance as the **Perimeter** that you calculated previously.

3. Draw another line that is only half the Perimeter's distance away from the same small end of the rectangle.

4. Cut out the rectangle, keeping your cut line as straight as possible. Do not cut along the lines that you drew in steps #2 and #3.



5. On the remaining piece of cardboard, draw a rectangle in the bottom right hand corner that is 4 cm wide. The rectangle's length is 4cm longer than the Horizontal Width of your phone.

6. Draw two lines, each line will be 2 cm from the edge of either of the smaller ends of the rectangle that you drew in step #5.

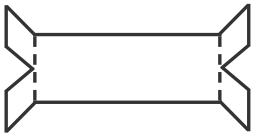
7. Divide each of these smaller rectangles that you created in step #7 by drawing a line through the middle of each.

8. Carefully cut out the full rectangle.

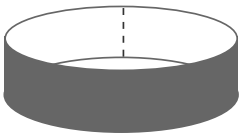
9. Fold along the lines that you created in step #7.

10. Cut along the lines that you created in step #8, forming two flaps on either side of the middle piece.

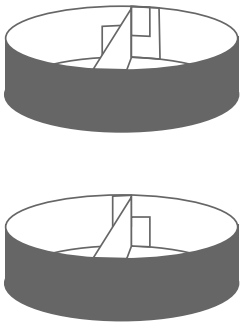
11. On each side, fold the flaps in opposite directions. This forms the middle piece that supports your VR viewer.



12. Create a loop by carefully placing a dot of hot glue on the tab to the right of line **C**. Circle edge **A** around so that it overlaps line **C**, keeping line **B** exposed to the inside of the loop.



13. Put a dot of hot glue on the two tabs on one side of the middle piece. Line the fold line on the middle piece up with line C on your loop.

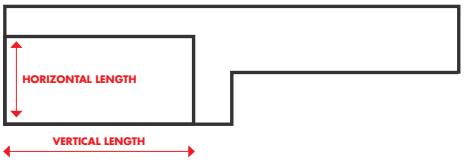


14. Put a dot of hot glue on the other two tabs of the middle piece. Line the fold line on the middle piece up with line B on your loop.

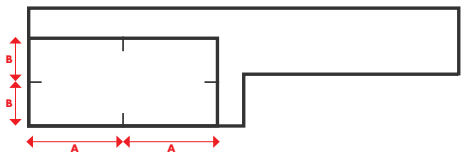
15. Shape your loop until it resembles an oval shape.

PART 3: FACEPLATE CONSTRUCTION

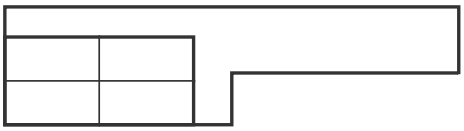
1. Measuring from the bottom left hand corner of your remaining cardboard, draw a rectangle that has a width equal to the **Horizontal Width** of your phone and a length that is equal to the **Vertical Length** of your phone.



2. Mark the middle point of each side of this rectangle. You can also use **Measurements "a" and "b"** as they already represent half of the vertical length and horizontal width of your phone.

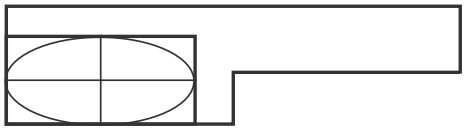


3. Connect the marks that you made in step #2, making 4 smaller rectangles.

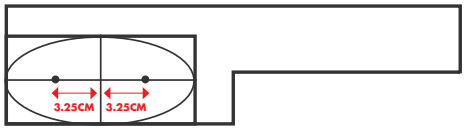


4. Place your loop over this rectangle, lining up the vertical line with the middle piece of your loop, making sure that the ends of the oval loop line up with all 4 middle points.

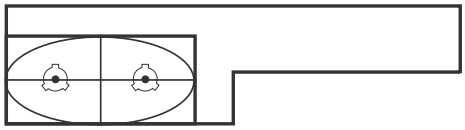
5. Trace the shape of the oval loop inside the rectangle.



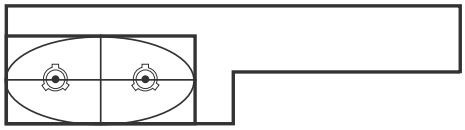
6. Mark 3.25 cm from the middle point of the oval in both directions along the horizontal line.



7. Center each lens over the marks made in step #6. Trace the shape of the lens around the mark.

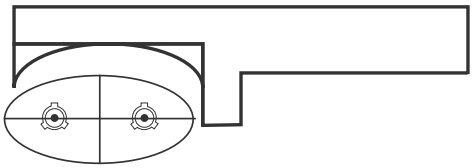


8. Draw a small circle that is just smaller than the outline of the lenses



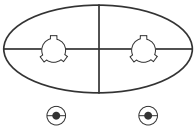
9. Carefully cut out the oval faceplate.

10. Lightly fold the faceplate along the horizontal line, pinching the fold tightly inside the circles that you drew.

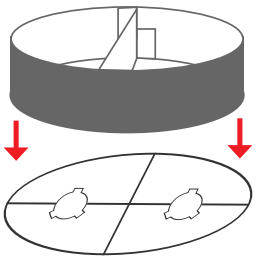


11. Carefully use the fold to cut slits inside the circular eye holes.

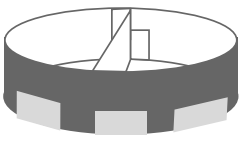
12. Cut out the eye holes by cutting out the inner circles that you drew.



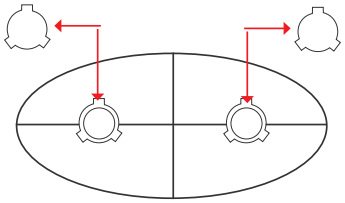
13. With your faceplate laying down, rounded side of the lenses facing up, line the middle piece in you loop with the middle vertical line on the faceplate.



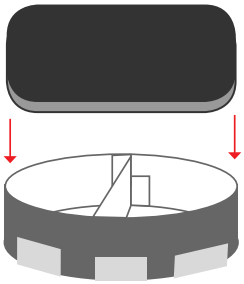
14. Tape the faceplate onto the loop.

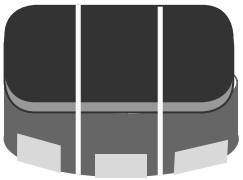


15. Glue the 2 lenses onto the faceplate, rounded side up, by adding a dot of hot glue in each of the 3 tabs that you traced onto your faceplate.



16. Using 2 thick rubber bands, attach your phone to the completed VR viewer with the screen facing the inside of the VR viewer.





17. To use your VR Viewer, select the Hydrocarbon Hunt app or other app or video that you'd like to experience. Hold your VR Viewer by the phone up to your eyes to view.