

# MAKING TARGET BOARDS

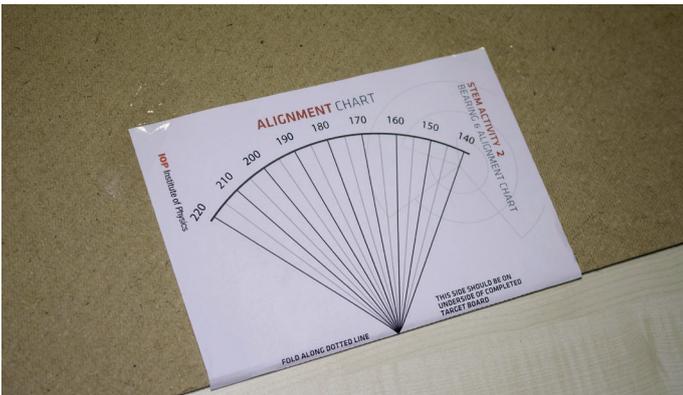
In this activity students build a ping pong ball model of a radar station and use it to find the position of targets hidden under a board. Each pair of students will need their own board with different target positions.

## EQUIPMENT REQUIRED (PER PAIR OF STUDENTS)

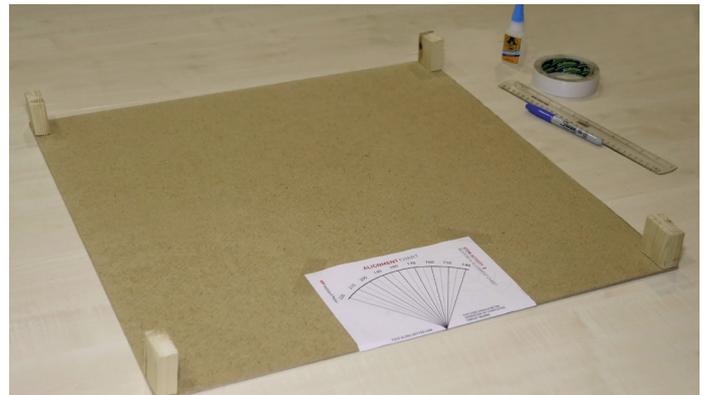
- 6 small wooden blocks of height 6 cm (eg made out of 20 x 44 mm timber cut to 6 cm lengths).
- Stiff board 60 cm x 60 cm (eg 3.6 mm thick hardboard)
- Copy of the Bearing & Alignment Chart
- Double-sided tape and/or superglue

## INSTRUCTIONS

Before making a board read the STEM student instructions for this activity. Then follow the steps below to make each board.



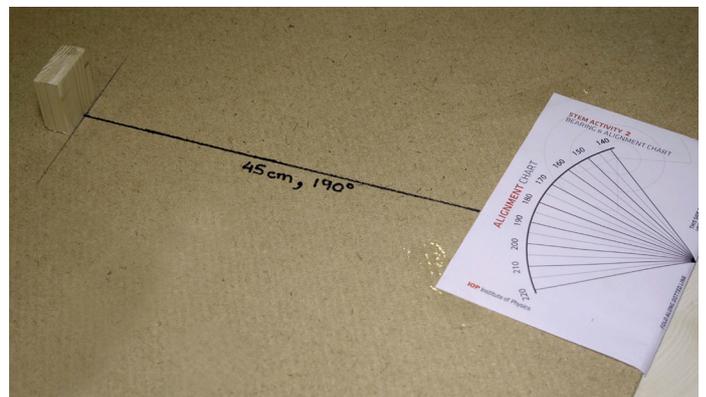
(a) Fold the Bearing & Alignment Chart in half along the dotted line. Place it in the middle of one edge of the board, with the alignment section facing upwards and the bearing section on the other side of the board facing downwards. Stick the sheet in position.



(b) Place the board on a flat surface with the alignment chart facing upwards. Stick four of the wooden blocks to the corners of the board to form supports.



(c) Choose an angle on the alignment chart (eg  $190^\circ$ ) and use a ruler to extend the line. (For each board you make, choose a different angle for the first target).



(d) Choose a distance (eg 45 cm) and measure that distance along the line from the edge of the board. Place a wooden block with its surface at a right-angle to the extended line to form a target. Stick the block in position.

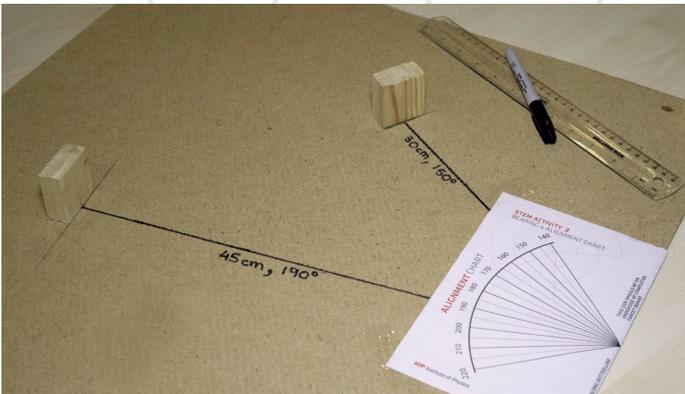
## STEM ACTIVITY 2 TECHNICIAN NOTES

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- (e) Repeat the process for a new angle (eg  $150^\circ$ ) and distance (eg 30 cm) to make a second target. Once again, before sticking the target in place, ensure that the surface of the target is at right angles to the extended line.
- (f) Turn the board over so that the bearing chart is facing upwards and stand it with on a hard surface (eg lab bench).

## TESTING THE BOARD



Test the first board you make using one rolled up sheet of A4 paper and one folded sheet of A4 paper to make a ping pong ball transmitter (see STEM student instructions). Launch ping pong balls at the board to ensure they can pass freely underneath it. If you find that balls can't pass under the board, try increasing the height of the wooden blocks (supports and targets).

Once you are satisfied with the first board, make more wooden blocks of the required height and repeat steps (a) to (e) to create further boards with different target positions. You will need one target board for each pair of students.

## SETTING UP THE ACTIVITY



The scenario for the students is that their radar station is facing south in order to detect enemy aircraft coming in over the English Channel during the Battle of Britain. Place each of the boards on a hard surface so that there is room for students to launch ping pong balls from the "north" end of their boards (the end with the bearing chart). For extra authenticity, you could also align the boards to the magnetic north-south direction in the lab using a map reading compass.