

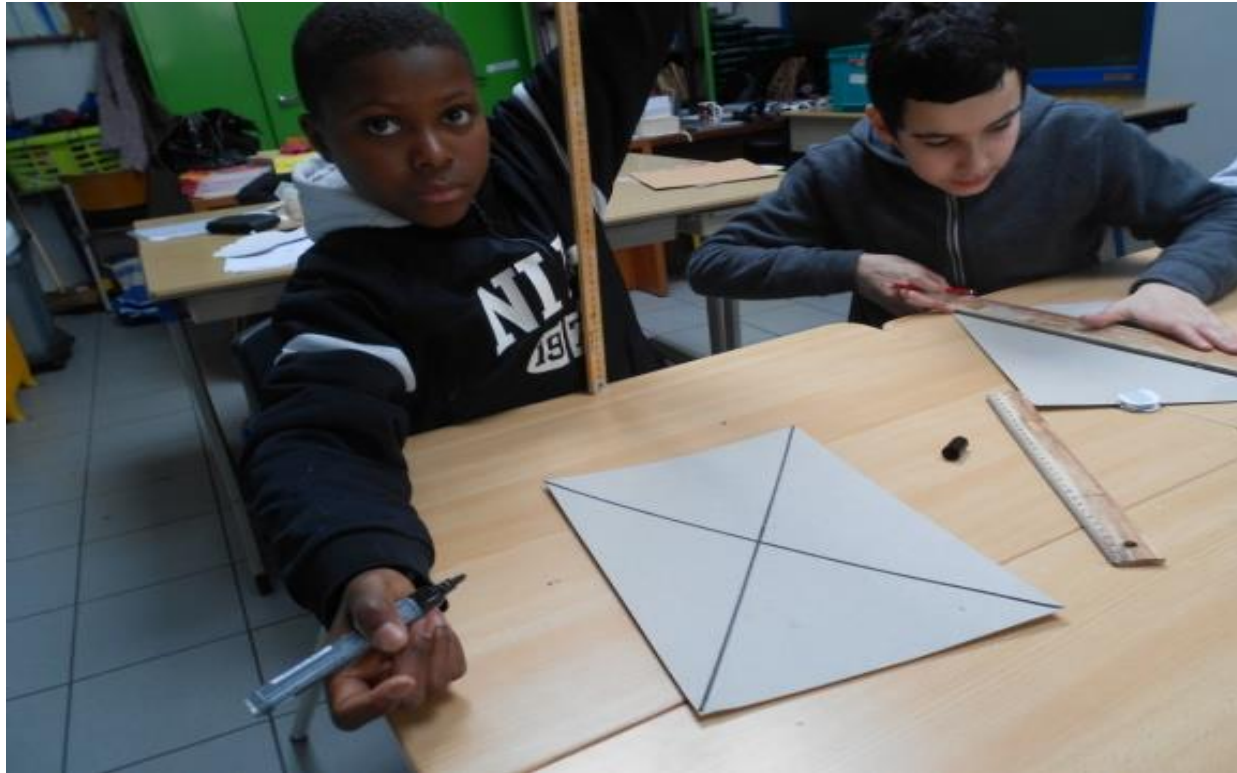
Balancing figures

Geometry

Finding the Centre of Mass (Centre of Gravity) of regular and irregular shapes with a plumb bob

1/Centre of Mass of regular shaped geometric figure

Geometric centre of a rectangle



The geometric centre of the rectangle which is the point of intersection of the diagonals, is its centre of mass.

Experimentally

You can find the center of mass experimentally by hanging the object from several points and using a plumb bob to mark the vertical line.

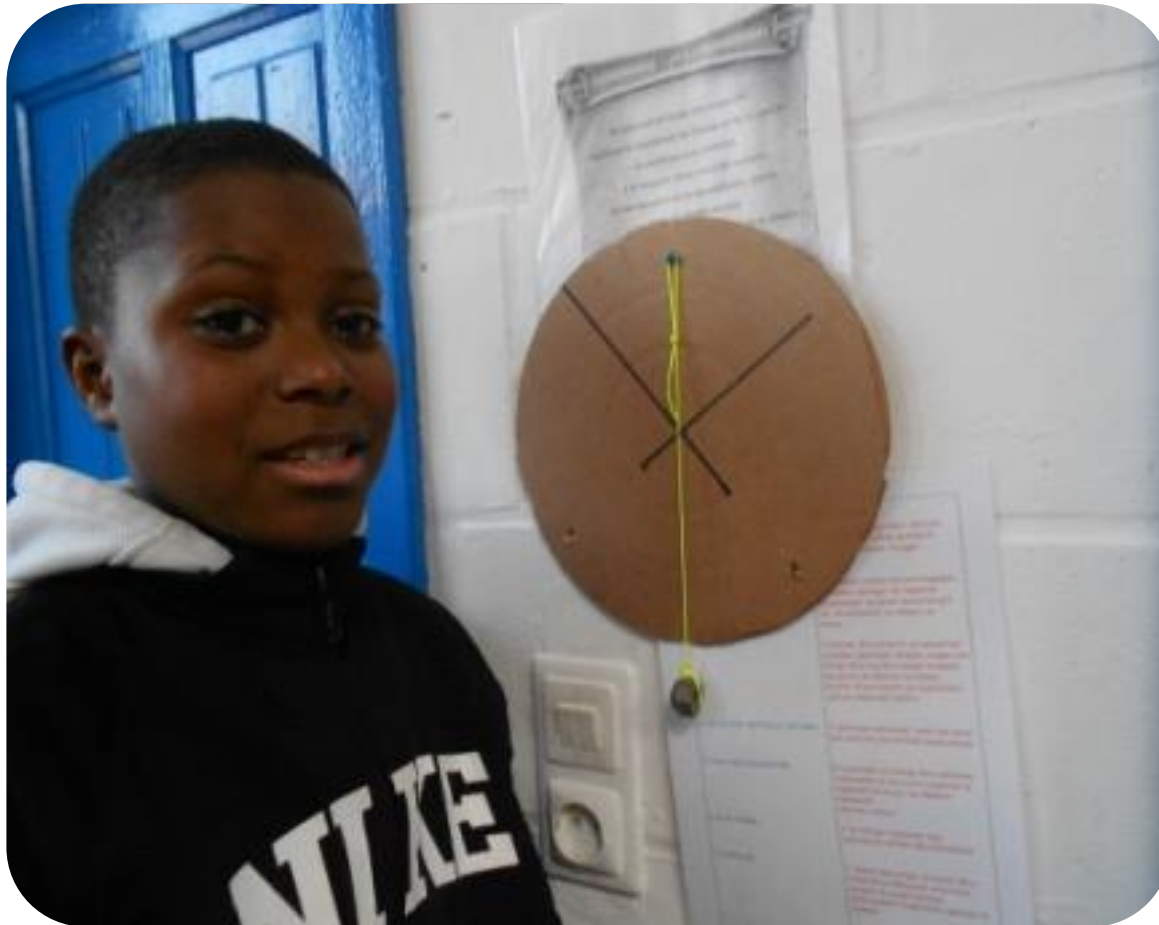
The intersection of two or more vertical lines from the plumb bob is the center of mass for the object.

❖ The centre of mass (= the geometric centre) of a circle (when you don't know the center)

- Attach the circle with the pin on a wall.
- Allow it to swing freely.
- Suspend the plumb bob on the pin in front of the circle.
- When it stops swinging, draw a line on the shape where the string of the plumb bob is hanging



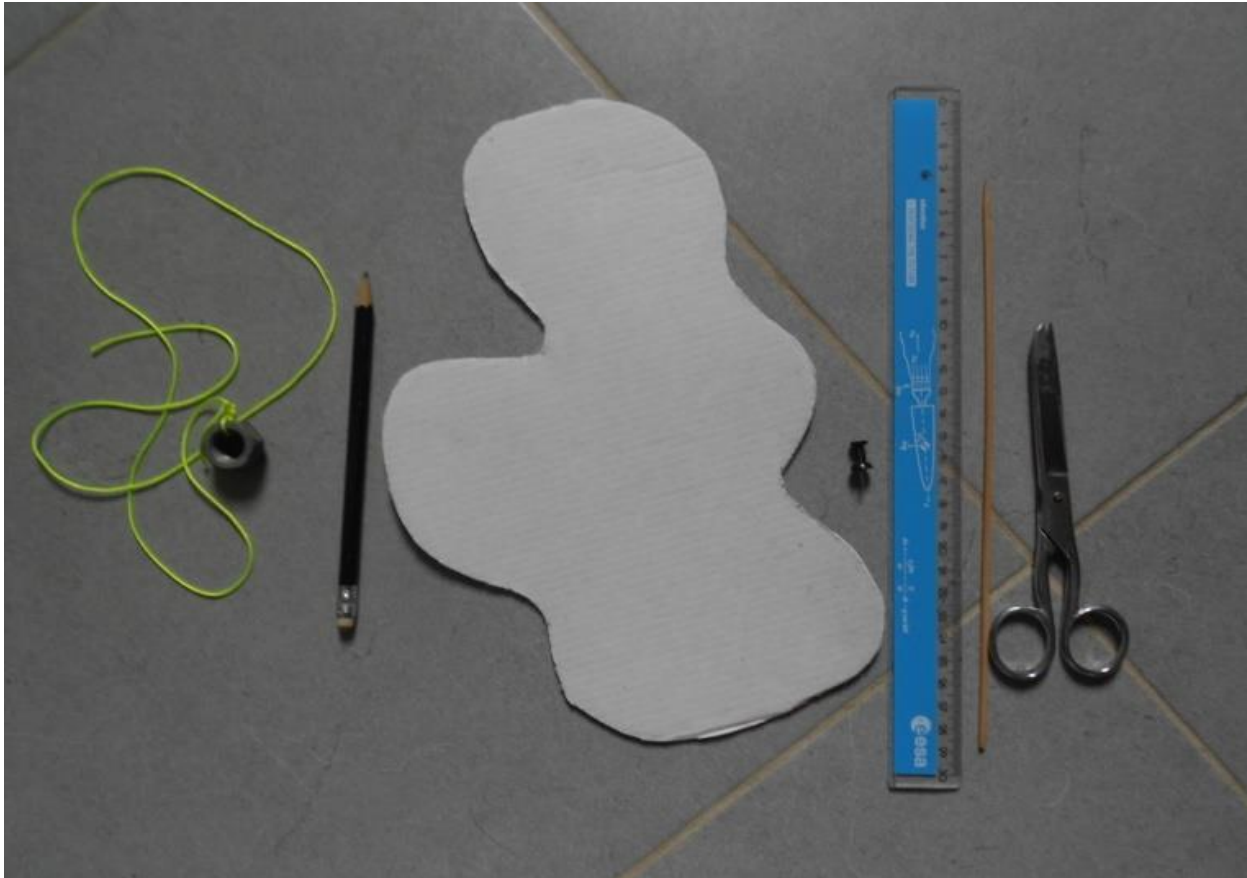
The experiment is repeated with the pin inserted at two other different points of the circle
If you have done this carefully, all three lines should intersect at the same point.



Now try to balance the shapes!!



2/ Center of Mass of irregular shapes

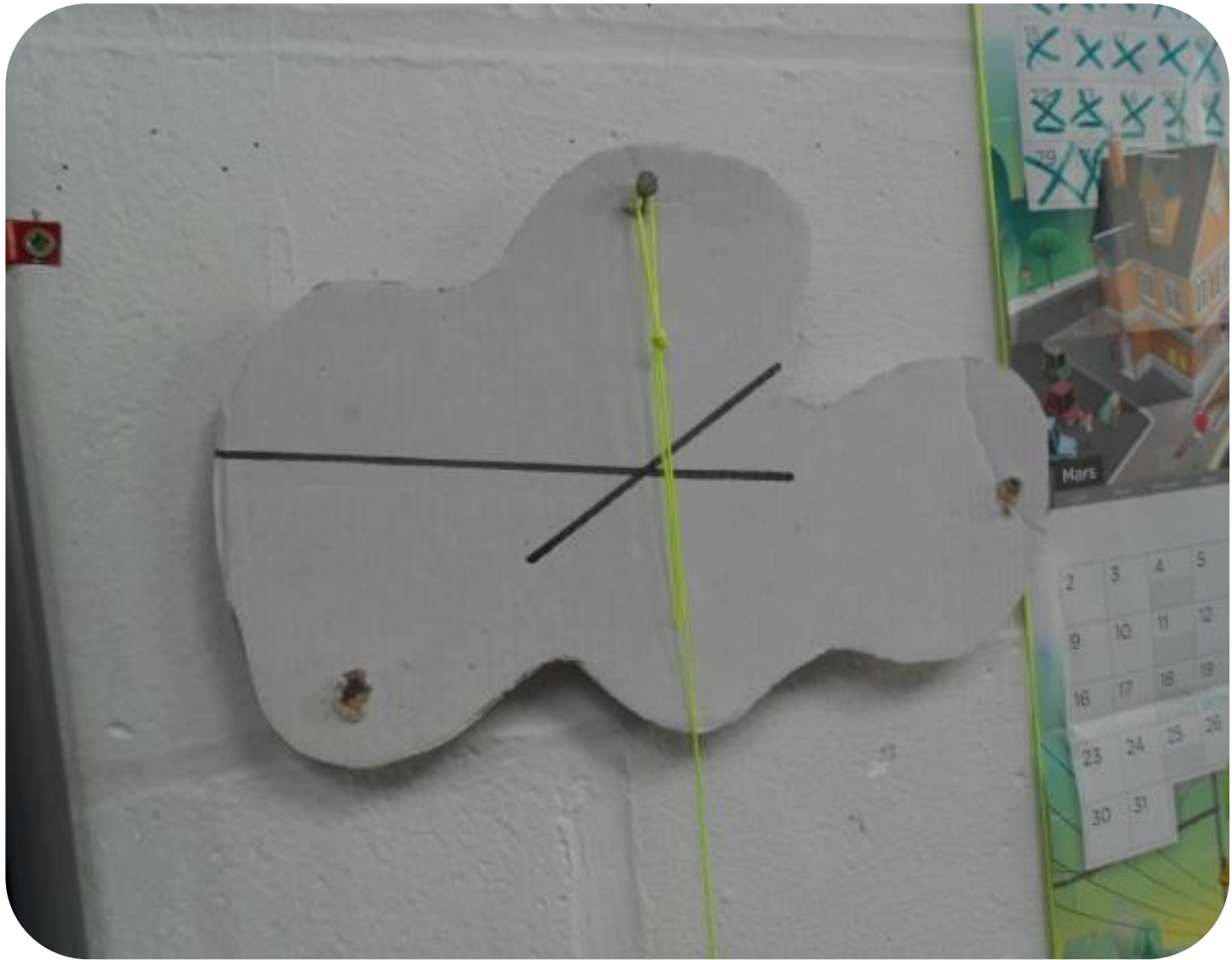


The shape is held by the pin. It can freely rotate; and the plumb line is dropped from the pin .



The experiment is repeated with the pin inserted at 2 other different points of the object

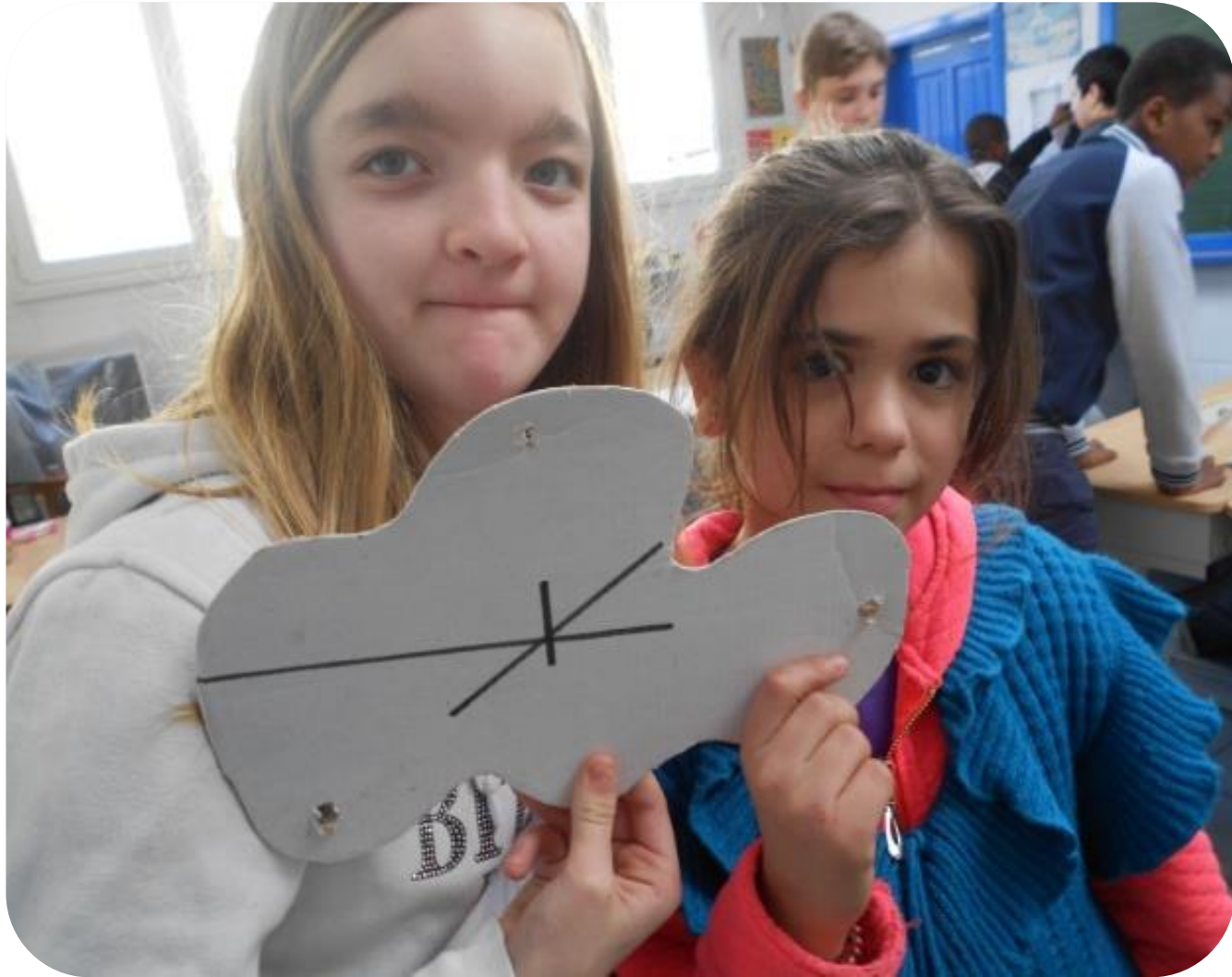




Mars

2	3	4	5
9	10	11	12
16	17	18	19
23	24	25	26
30	31		

The intersection of the lines is the center of mass of the shape.

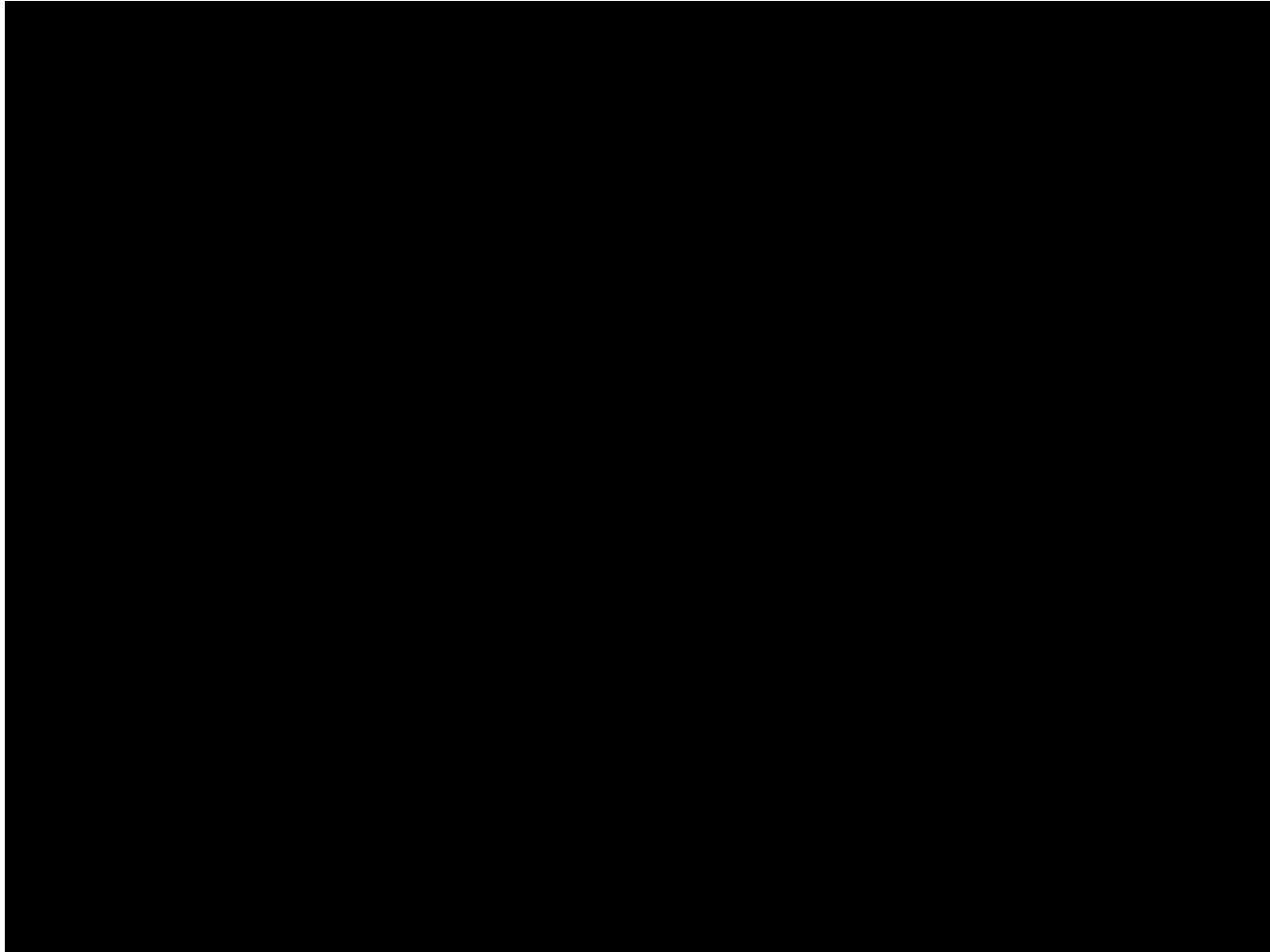


Now try to balance this shape at this point on your skewer , you pencil or... your finger !

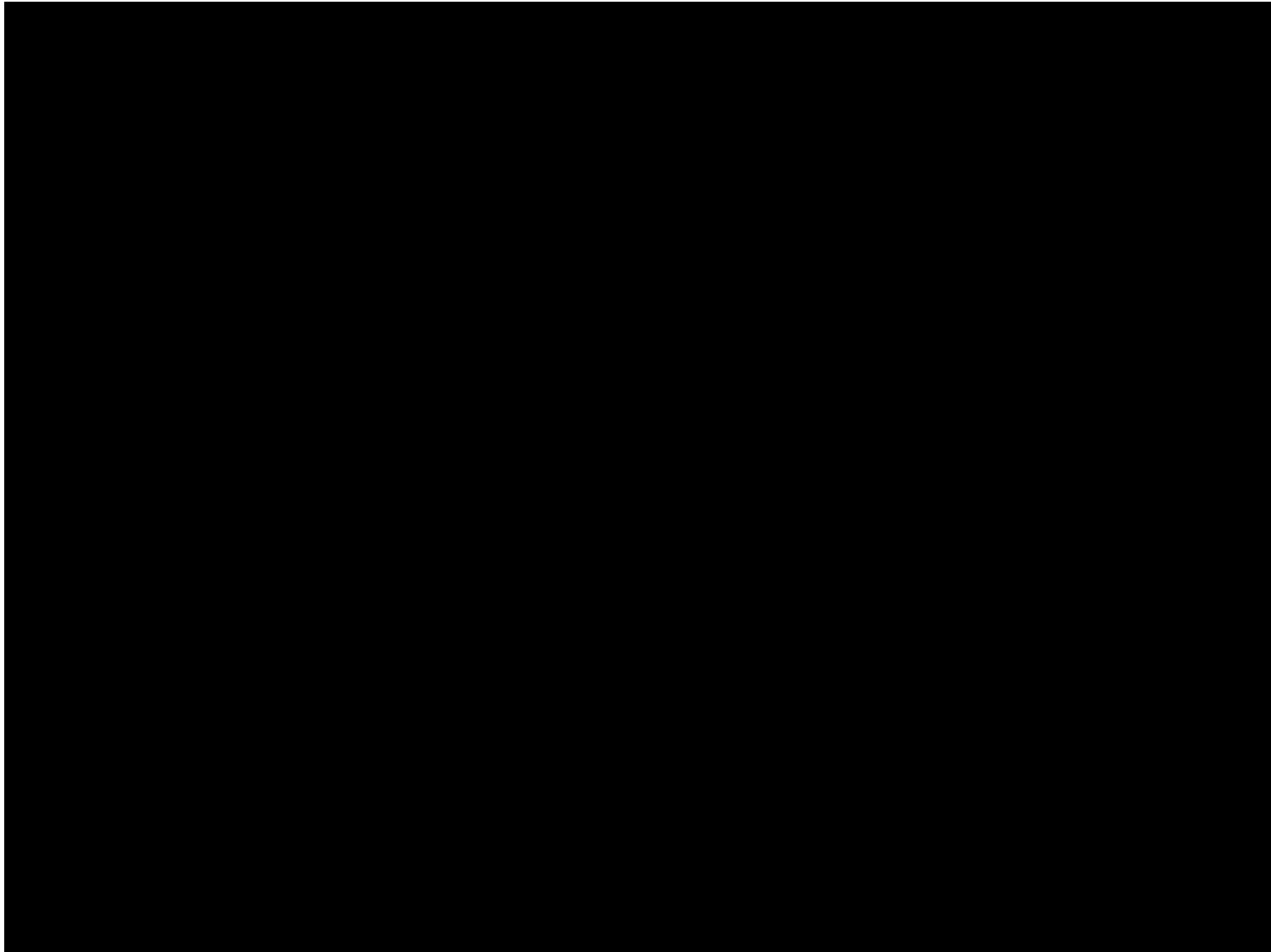


Centre of Mass (Centre of Gravity) of a circle

**1/The circle is held by the pin. It can freely rotate;
the plumb line is dropped from the pin .**

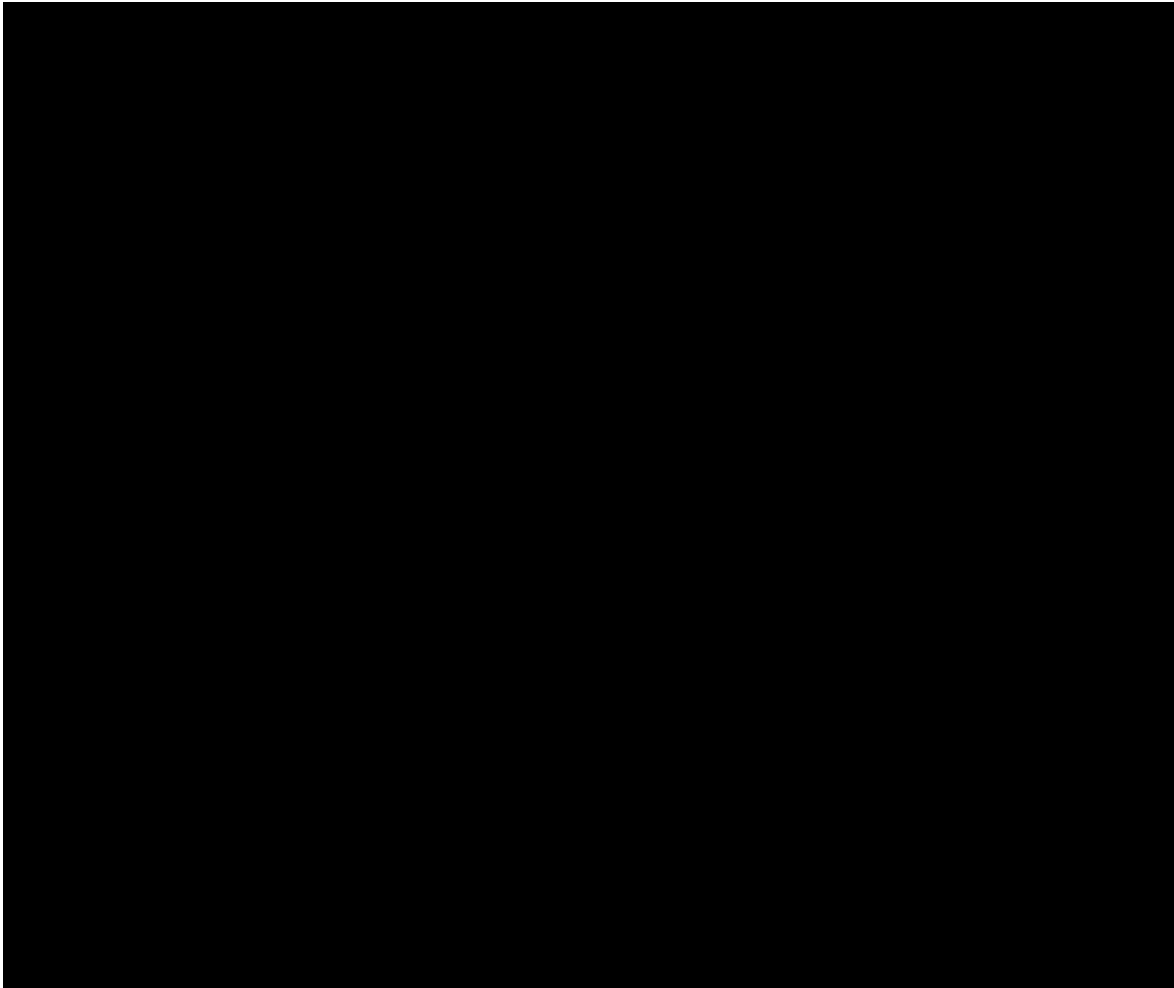


2/ If you have done this carefully, all three lines should intersect at the center of mass!

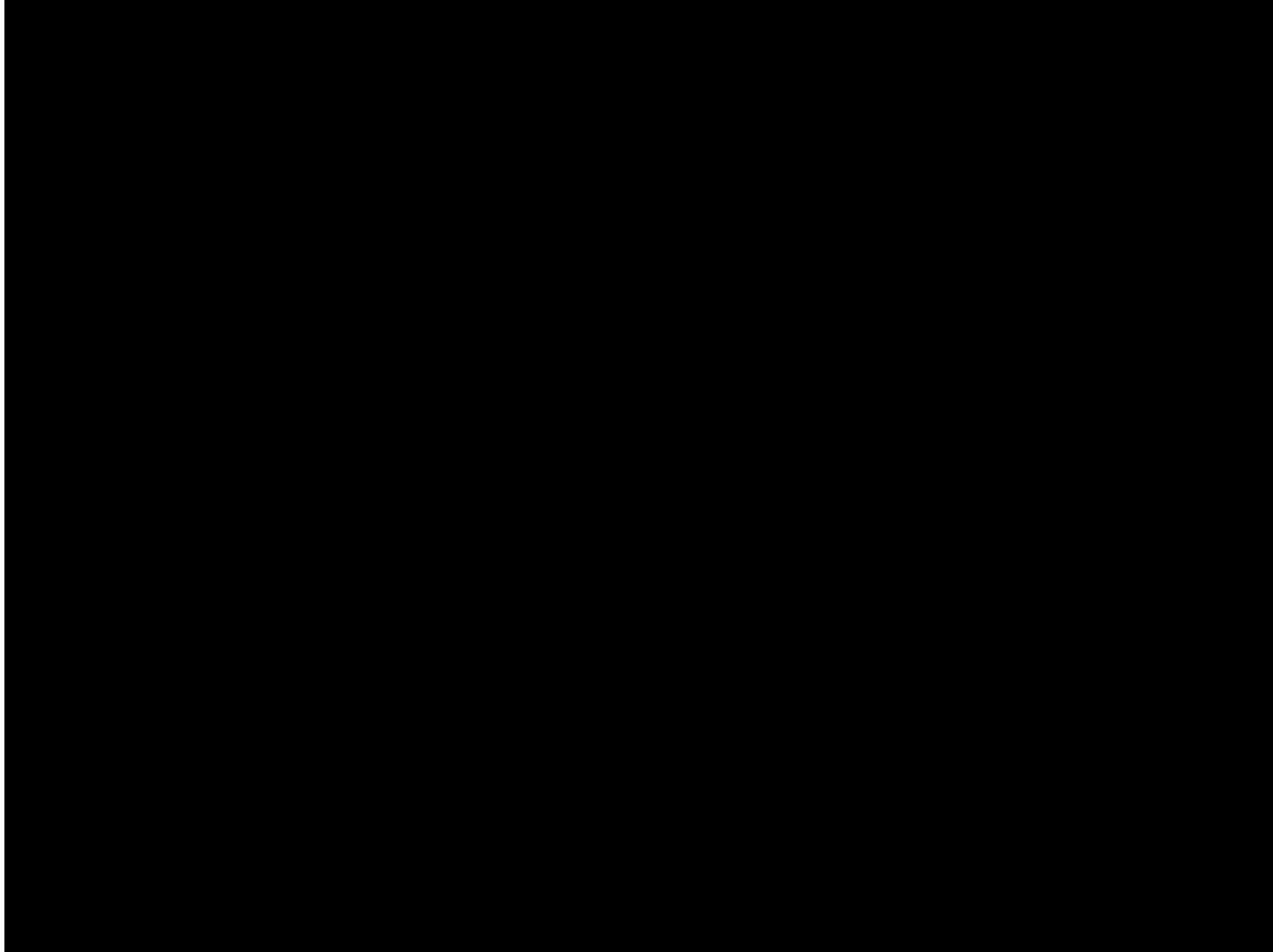


Centre of Mass of irregular shapes

1/What you need



2/Attach the shape with the pin on a wall or on the board. Allow the shape to swing freely.



3/

- **Suspend the plumb bob on the pin in front of the shape.**
- **Draw a line on the shape where the string of the plumb bob is hanging**
- **Do this two times more in different points**
- **All three lines should intersect at the same point**

