PARACHUTE

Name of the object	Leonardo Da Vinci's parachute
Recommended ages (from…)	Start at 10 years old
Thematic areas combined (STEAM)	Science Technology Engineering Art Mathematics
Materials needed	**Level 1** Different materials: ● Tissue paper, paper towels, silk, plastic bags, transparent fabrics, etc. (42 x 30 cm) ● 5 thin wooden sticks or rigid straws (13 cm) ● Thin rope or twine (4 x 25 cm) ● Double-sided scotch tape, scissors, wire cutter, glue (hot glue with gun) ● A small figurine (or 6 paper clips) **Level 2** Different materials: ● Tissue paper, paper towels, silk, plastic bags, transparent fabrics, etc. (42 x 30 cm) ● 5 thin wooden sticks or rigid straws (11,5 cm) ● Thin rope or twine (4 x 25 cm) ● Double-sided scotch tape, scissors, wire cutter, glue (hot glue with gun) ● A small figurine (or 6 paper clips) ● A3 sheet ● Compass, pencil, ruler, eraser, markers

Instructions step by step	**Step 1**. Setting up all the materials and looking at instructions and models. **Step 2**. Building **the parachute patterns** - or using the patterns provided (according to the level). **Step 3**. Building **the parachute fabric,** in the chosen material to the dimensions of the pattern. **Step 4**. Building **the two parachutes.** **Total duration:** **Level 1: 1h** **Level 2: 1h20**

Step by step: how to build the parachutes

Step 1

Time needed: 10 minutes.

Leonardo da Vinci was born in 1452 in Vinci, Italy and died in 1519 in Ambroise, France. He was a painter, inventor, engineer, scientist, humanist and philosopher. Between 1485 and 1502, Leonardo da Vinci imagined the first parachute, a pyramidal parachute.

From Leonardo's drawings, the aim is to design two different parachutes (with or without a chimney) and see which one works best.

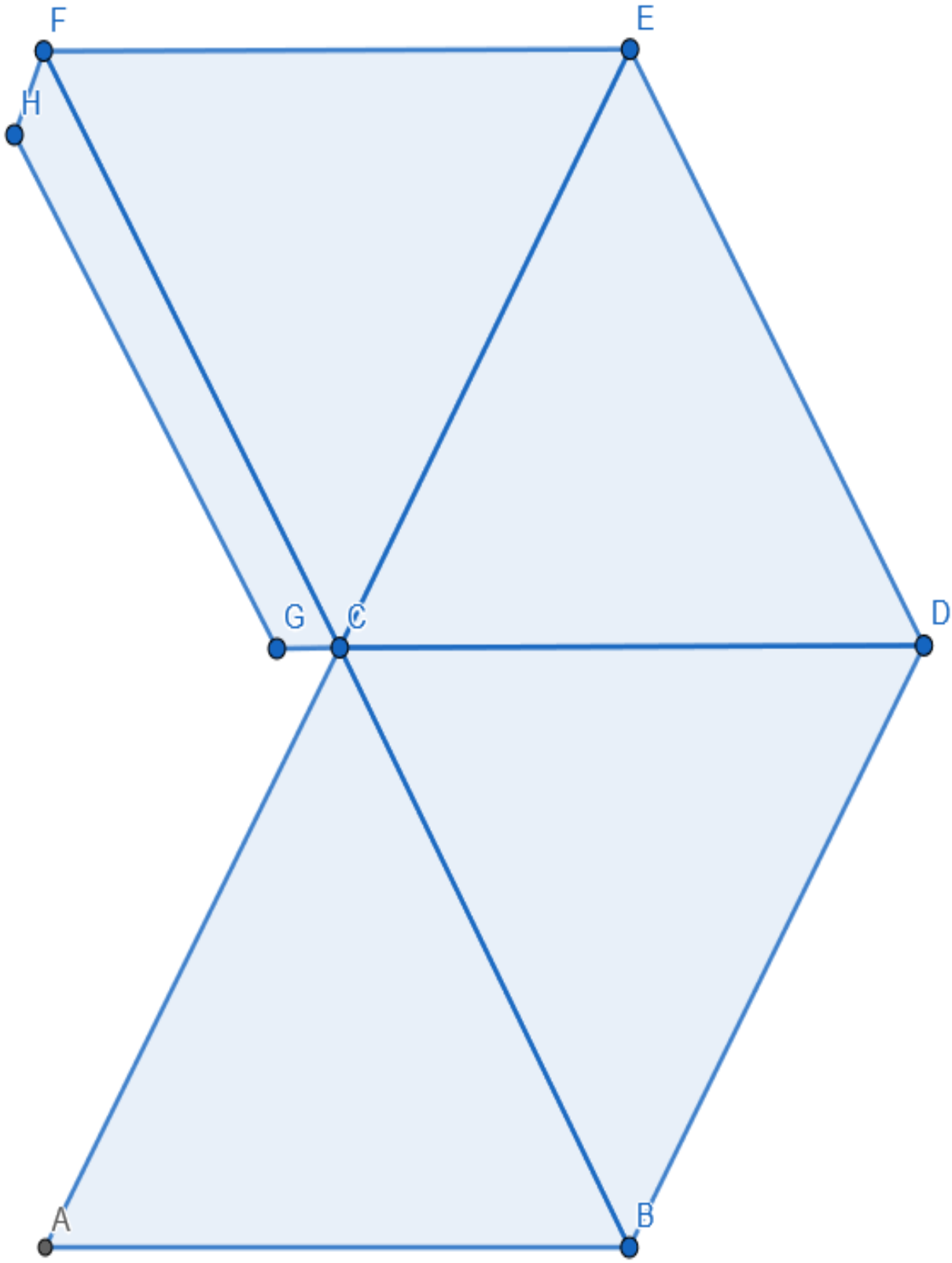
First, set up all the materials and look at the instructions and models.

All the pieces ready to use.

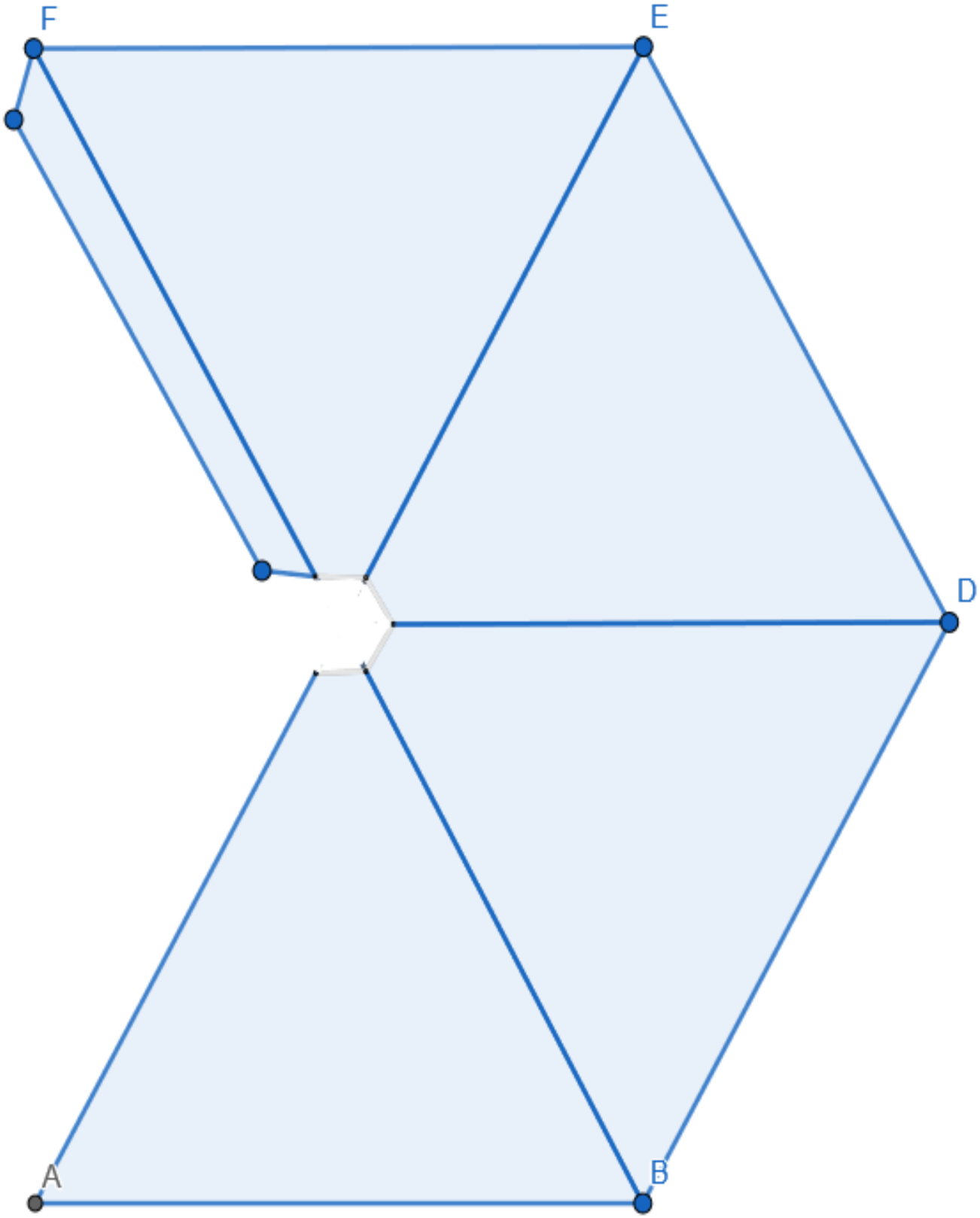
Look closely at the drawing of Leonardo da Vinci's parachute and the two patterns you have to make or cut out.

“Anyone with a tightly woven canvas tent twelve armfuls wide and twelve armfuls high can safely throw themselves from any height”
Quote from Leonardo da Vinci

Model 1: Parachute without chimney



Model 2: Parachute with chimney



Step 2

Build the parachute patterns - or use the patterns provided

Time needed:
Level 1: 10 minutes
Level 2: 30 minutes

Level 1 – Use the patterns provided
(From 10 to 12 years old)

Choose a model of parachute (with or without a chimney).
Provide the pattern with a size of 12 cm for the sides of the equilateral triangle.

- Print out the parachute pattern

- Cut out the pattern

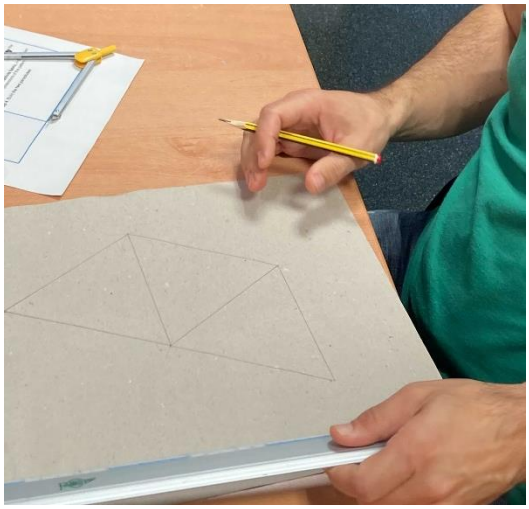
Level 2 – Build the parachute patterns
(From 13 to 15 years old)

Take an A3 sheet.

- Choose a model of a parachute (with or without a chimney).
Draw the pattern chosen.

WITHOUT CHIMNEY PATTERN

Draw an equilateral triangle ABC with 12 cm sides. From the side CB of this triangle, draw a new equilateral triangle BCD of the same size and then repeat this for two other triangles DCE and ECF to obtain the same pattern as in model n°1.
Add a strip along the last side of the equilateral triangle to allow for assembly.



WITH CHIMNEY PATTERN

Repeat the same construction as above (without chimney pattern). At 1 cm from the common vertex C of the equilateral triangles, mark a point on each of the sides CA, CB, CD, CE, CF which you will name I, J, K, L and M.

Connect I, J, K, L and M and erase segments CI, CJ, CK, CL and CM.
Add a strip along the last side of the polygon to allow assembly.

- Cut out the pattern.

Step 3

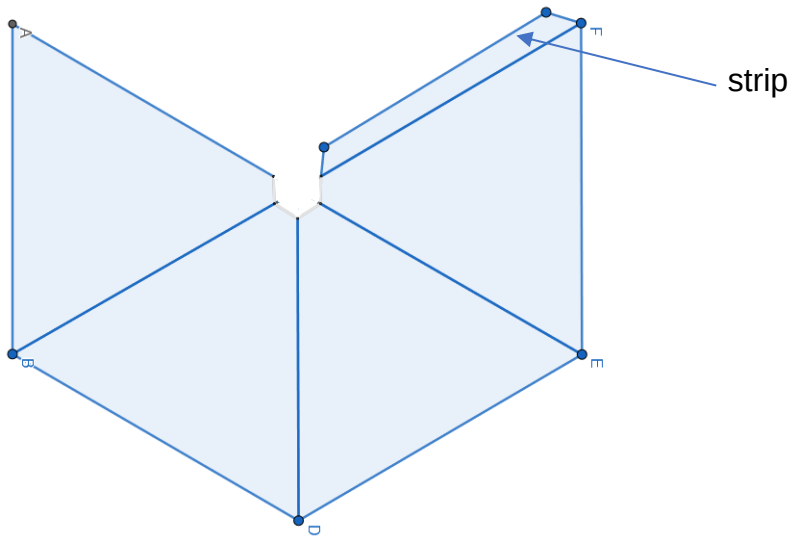
Build the parachute fabric in the chosen material to the dimensions of the pattern

Time needed: 15 minutes

Place the chosen material (paper towel, tissue, plastic bag…) under the pattern (with or without a chimney). The pattern must cover the material.

With a pen, draw the outline of the pattern on the material. Use a ruler if this is a problem.

Cut out the pattern and draw the edges of the equilateral triangles and the edges of the strip of the pattern on the chosen material.



Step 4

Build the parachute without a chimney and the parachute with a chimney.
Time needed: 25 minutes

- Cut the 4 sticks or straws of 13 cm with scissors. Use a wire cutter if it is difficult.

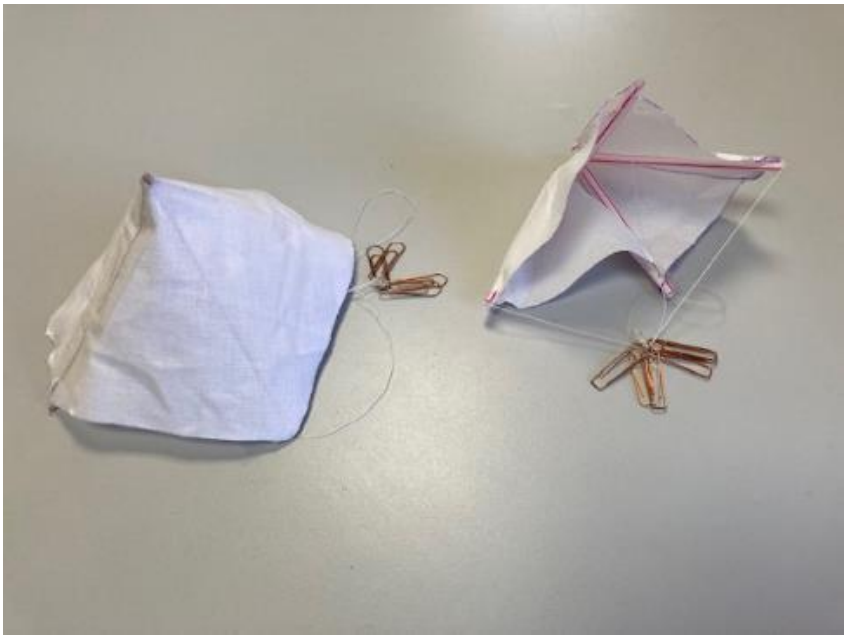
- Cut 4 threads of 25 cm each.

- The threads are first attached to the sticks or straws before assembly.

- Place the sticks + threads on the 4 sides of the equilateral triangles starting from the common vertex. Fix them with double-sided tape or hot glue. Adjust the cut of the sticks or straws to fit the construction and to facilitate assembly.

- Assemble the construction to obtain a pyramid with a square base.

- Gather the ends of the wires and attach a small figure (you can create it with a 3D Printer) or 6 paper clips for weight.



Now it's your turn to test the parachutes and see which one flies best!

Resources

http://www.lespetitsdebrouillards.be/

http://pedagogite.free.fr/technologie/fabriquer_parachute.pdf

http://ecoles33.ac-bordeaux.fr/lugon/classes/MSGS/2006/reve%20et%20vent/page.htm

https://www.chutelibre.net/histoire.html