



## The Smart Light project

*Ideas for crafting*

## General considerations

Crafting/ handcrafting is considered as a pivotal point and a complementary task that can imbue meaning to the project. Through the crafting process (highly interwoven in the robotic artefact construction) students become more engaged to the entire process as they explore of a number of engineering and design concepts, and they consider multiple solutions in order to achieve the results that they want.

The present document contains certain different ideas and approaches on crafting for the smart light project. Each of them is based on the use of simple (and recyclable) materials that can be easily accessed and modified. The proposed techniques and the corresponding steps are optional and indicative. Students should be encouraged to use any material they like as well as to experiment with different designs, forms and constructing techniques. In this way they will be able to overcome any design-related problem (e.g how to create a stable structure, how to embed the circuit to their model etc.).

## - Creating a street smart light



Figure 1: The street-smart light

The following images depict the procedure of modelling a street-smart light by using a straw, cardboards or a ready-made box and copper tape. Apart from the aforementioned materials, students will also need a scissor or a cutter, a ruler, paints or coloured papers for decoration, as well as glue or tape.

The straw will be used for the creation of the light pole. Depending on the diameter of the straw, students can either embed the cables of the LED in the interior of the straw, or use copper tape to create two distinctive conductive paths at the exterior of the straw (Figure 2). Then, they have to attach the LED on the straw (Figure 3), keeping in mind to mark the side of the anode or/and the cathode.

A cardboard or a ready-made box can be used for the creation a base for the street light. After creating the base by measuring and folding the cardboard, they have to create two holes close to the edge of the base, so as to embed the light pole and the PIR sensor (Figure 4).

After finishing the structure (Figure 1), the students can be encouraged to decorate it by using paint, coloured papers or even stickers, in order to create the road and or other elements of the urban equipment.



Figure 2: Covering the straw with the copper tape. Important note: When using copper tape, you should bear in mind that in case of overlapping, a short circuit will be created.

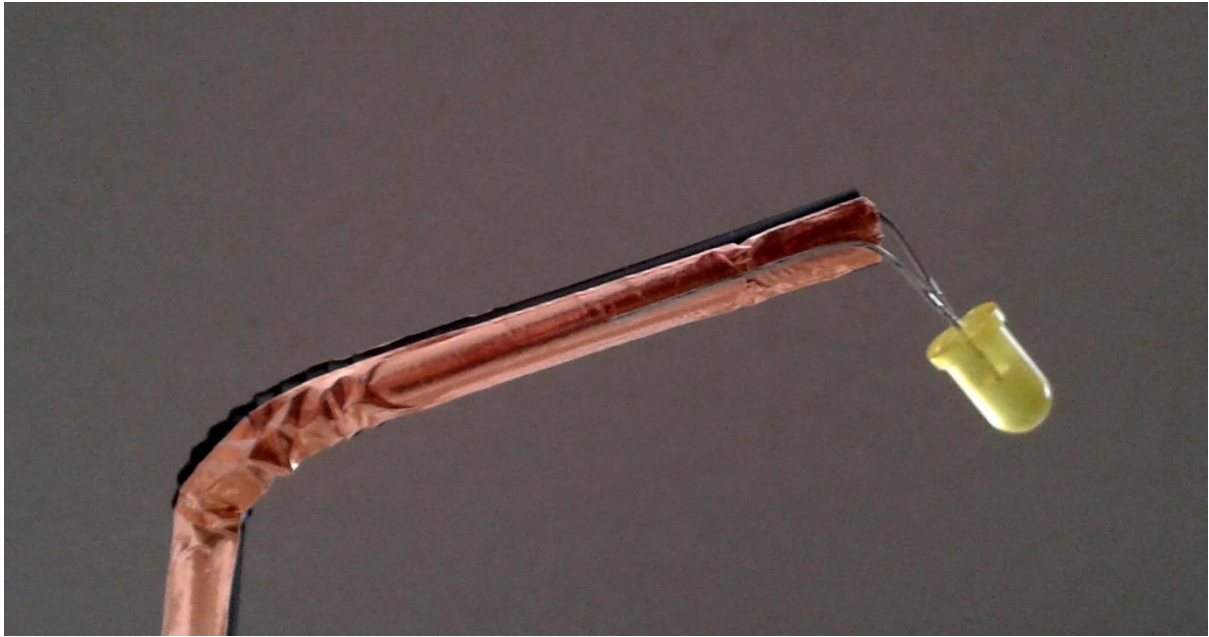


Figure 3: Attaching the LED on the straw



Figure 4: Embedding the PIR sensor and the straw on the base.

## - Smart table lamp



Figure 5: A smart table lamp from paper and cardboard.

The following images depict the procedure of modelling a smart table lamp by using a blank A4 paper and cardboards (Figure 5). Apart from the aforementioned materials, students will also need a scissor, a cutter, a ruler, as well as glue.

The blank paper will be used for the creation of the lamp. The design is indicative. Students should be encouraged to search for and/or experiment with other forms and designs.

Place the paper in landscape orientation (Figure 6a), and draw two horizontal lines in a distance of 2cm from the edges of the paper (Figure 6b). On each line, create a point in a distance of 7cm from the vertical edges, and draw two oblique lines, as it is indicated in the image (Figure 6c). Cut and remove the two created triangles and divide the remaining horizontal lines in spaces of 1cm (Figure 6d). Then with the help of the ruler, and by using the cutter, cut the paper in oblique and parallel stripes (Figure 7). Use the glue to connect the external stripes of the paper. Your lamp is ready (Figure 8).

Next you need to create a base where the LED and PIR sensor will be embedded. On a cardboard, draw and cut a circle, and a stripe that is slightly bigger than the PIR Sensor. Carve the stripe in order to make it more flexible (Figure 9c). Create a hole for the PIR Sensor and glue the stripe to the circle (Figure 10). Your base is almost ready. Embed the PIR Sensor and the LED and then glue the lamp on the base.

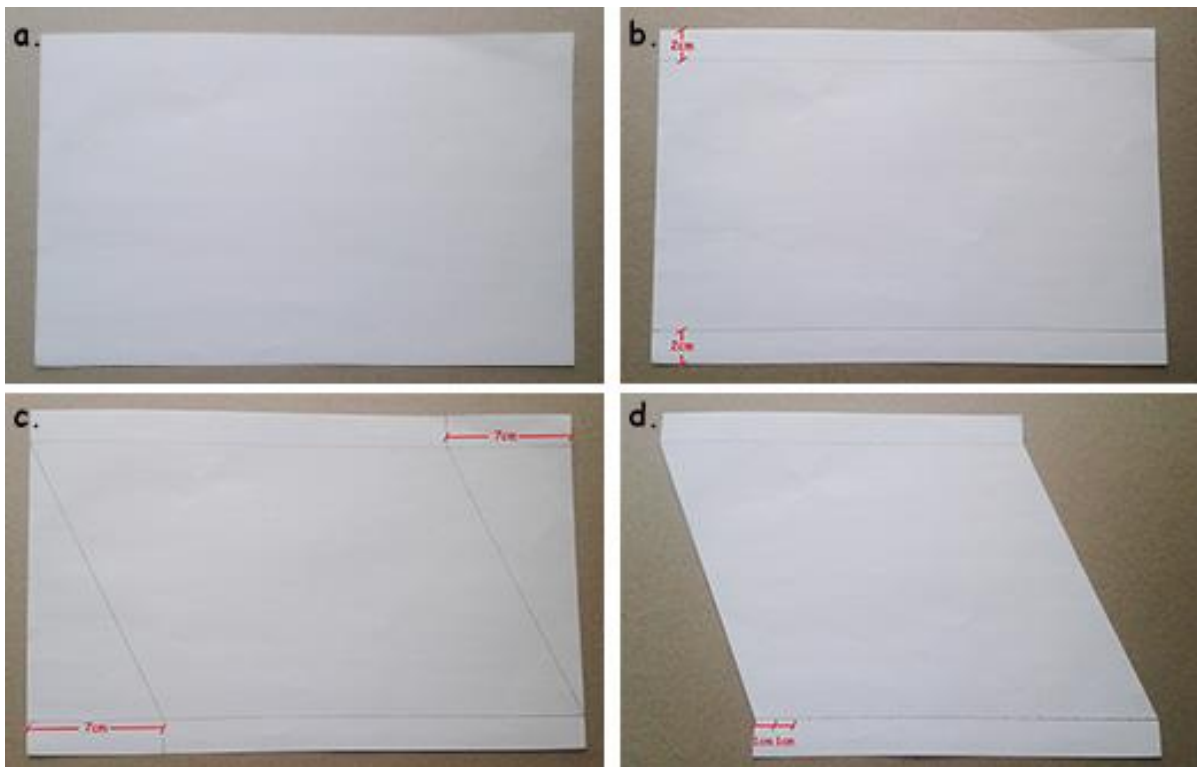


Figure 6: a. Placing the paper in landscape orientation, b. Drawing the horizontal lines in a distance of 2 cm from the edges, c. Measuring 7cm on each line and drawing two oblique lines, d. Removing the triangles and dividing the lines

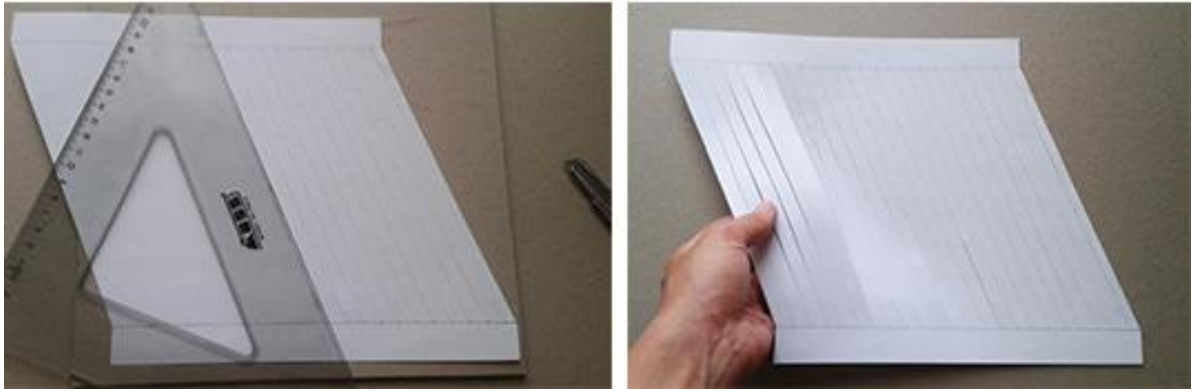


Figure 7: Cutting the paper in parallel and oblique stripes by using a ruler and a cutter

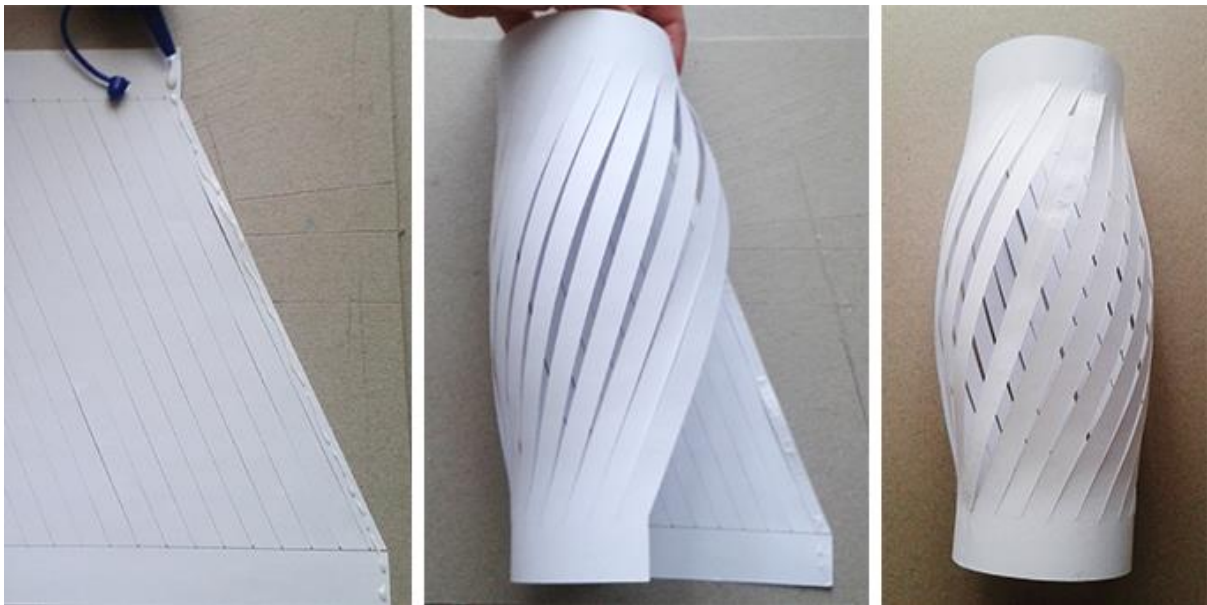


Figure 8: Folding and gluing the external stripes to create the lamp.

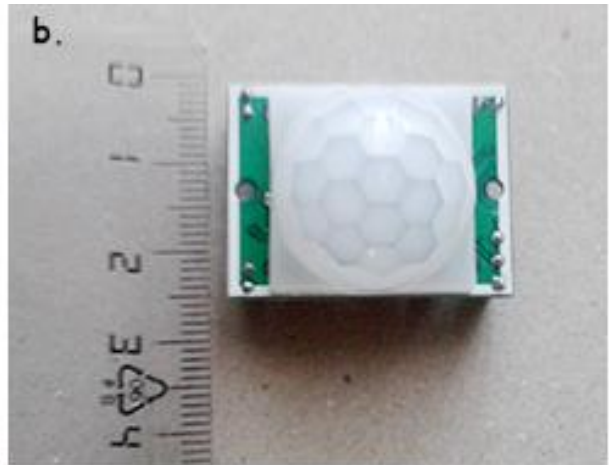
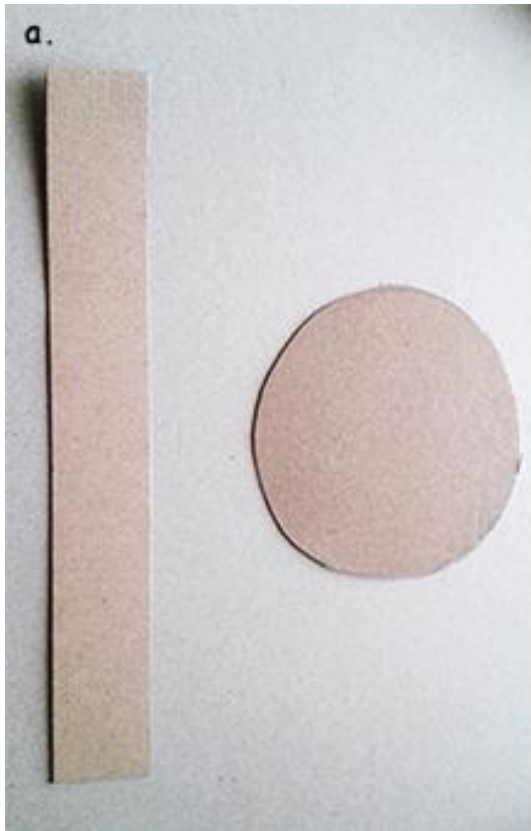


Figure 9: a. Creating a circle and a stripe from cardboard, b. Measuring the PIR sensor in order to calculate the width/height of the stripe, c. Carving the stripe to make it more flexible



Figure 10: (Left) Gluing the stripe to the circle, (Right) Embedding the PIR sensor and the LED

## - More ideas...

Encourage your student to use their imagination and think how they can use various and/or different materials in order to create a lamp. Plastic cups for example can be also implemented for the creation of a simpler or a fancier lamp. Papier-mâché could be also an alternative technique for modelling and decoration. They should also be encouraged to embed reflective materials to their models in order to make their lamp brighter.

They should also be encouraged to think of different implementations for a smart light (e.g. create an external light for the doorstep of a house).

Last you can encourage them to use artworks in order to make their smART light/lamp. They can also get inspiration from artworks and apply their own artistic approach on the robotic artefact.



Van Gogh table lamp



Monet table lamp



Miro- inspired table lamp



## **ROBOSCIENTISTS PROJECT**

Motivating secondary school students towards STEM careers through robotic artefact making

**Erasmus+ KA2 2018-1PL01-KA201-051129**

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### **Declaration**

This report has been prepared in the context of the ROBOSCIENTISTS project. Where other published and unpublished source materials have been used, these have been acknowledged.

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