

# Developing STEAM skills observing the phototropism

## 1 Overall aims:

### Cognitive

- Discover the importance of light for plants
- To observe the plants phototropism
- To improve the knowledge in the plant's movement in search of light

### Affective

- To experience the feeling of success

## 2 Vocabulary - keywords

Mathematical: calculate the germination time, calculate the phototropism time, measuring the length of the stem each day

Science: phototropism, light

Sustainability: plants need of light, importance of plants adaptation to light

Art: design a labyrinth of light in a box

## 3 Sustainable abilities developed

- Anticipatory competence (Checking the importance of plants adaptation to their environment)
- Problem solving competence

## 4 Pillars of sustainability included

- Environmental sustainability

## 5 STEAM domains

- Engineering skills: design a labyrinth of light in a box so that the plant can grow
- Science skills: design an experiment to test phototropism, hypothesize
- Sustainable skills: respect the uptake of plants to their environment
- Artistic skills: design a labyrinth of light in a box



## 6 Teaching methodologies/activity outline

1. Plant one of your bean seeds in a pot into a box, water them, and wait for them to poke out of the ground
  2. Let the seed germinate and the plant begin to grow
  3. You can cut out two cardboard rectangles and in each one open two windows in the box. Make an opening at the top of the box as well. Let the seed germinate and the plant begin to grow
  4. Put the box near a window with light or put a small lamp on top
  5. Leave the plants to grow for a week
  6. Check daily that the soil or cotton is moist and measure the length of stem growth
  7. After one week you can check how the plant comes out at the top of the box
  8. Open the box to see the labyrinthine journey that the plant has made to find the light. This movement that plants make to seek light is called phototropism
  9. Deduce the importance of plants' adaptation to their environment
- The experiment will be designed like the picture 1



## 7 Expected learning outcomes

**The child will be able to:**

- design an experiment to test phototropism
- daily measure and record the changes registered by the plants
- deduce the importance of plants' adaptation to their environment



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## 8 Assessment

Initial assessment: Asking children about contents to know their background

Formative assessment: Observation with a rubric

Summative assessment: Evaluate the whole procedure/Making an individual exercise

## 9 Equipment and materials to be used in learning unit (tools, ingredients etc)

- 1 big cardboard box
- Piece of cardboard
- Ruler
- 1 small lamp
- Masking tape
- Water
- Spray bottle
- 1 bean seed

## 10 Kind of setting - lab, kitchen, outdoor etc.

1. Classroom
2. Plastic art classroom
3. Lab

## 11 References - source:

Wiston, R. (2017). Un laboratorio en casa. Grandes experimentos para futuros científicos, pp. 138-143.

<https://untamedscience.com/biology/plants/phototropism/>

<https://www.youtube.com/watch?v=HmHvWDeTt7Y>



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