Vahrusheva Djulya 10ib

Laboratory work on a theme

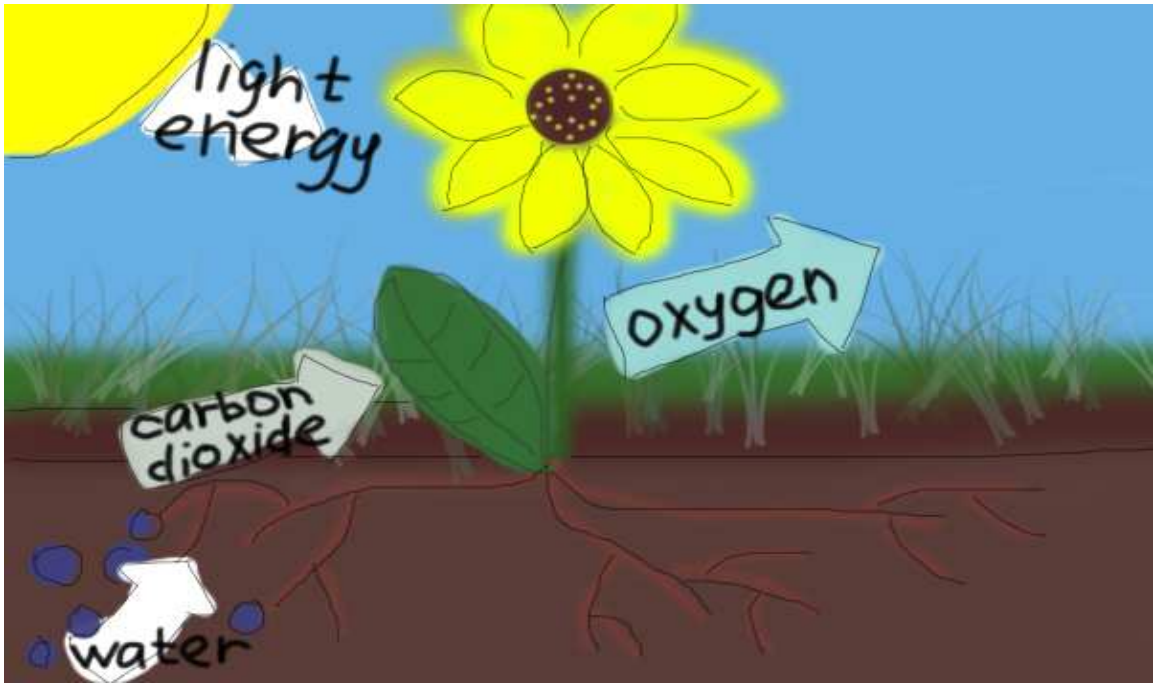
# "The dependence of the rate of photosynthesis on light intensity"

## Introduction

Photosynthesis is a process of converting light energy to chemical energy. The process of photosynthesis takes place in the chloroplasts, specifically using chlorophyll, the green pigment involved in photosynthesis. I had to test one of two reactions of photosynthesis: the light reaction because only it used the light reaction. The main chemical reaction involved in photosynthesis is:

$6CO_2+6H_2O$ (+light energy) $\rightarrow C_6H_{12}O_6+6O_2$

I controlled all these conditions and made my own experiment, which proved that the light reaction really needs light to produce $O_2$.




## Aim

Determine intensity of photosynthesis on allocation of $O_2$, depending on the light exposure.

## Variables

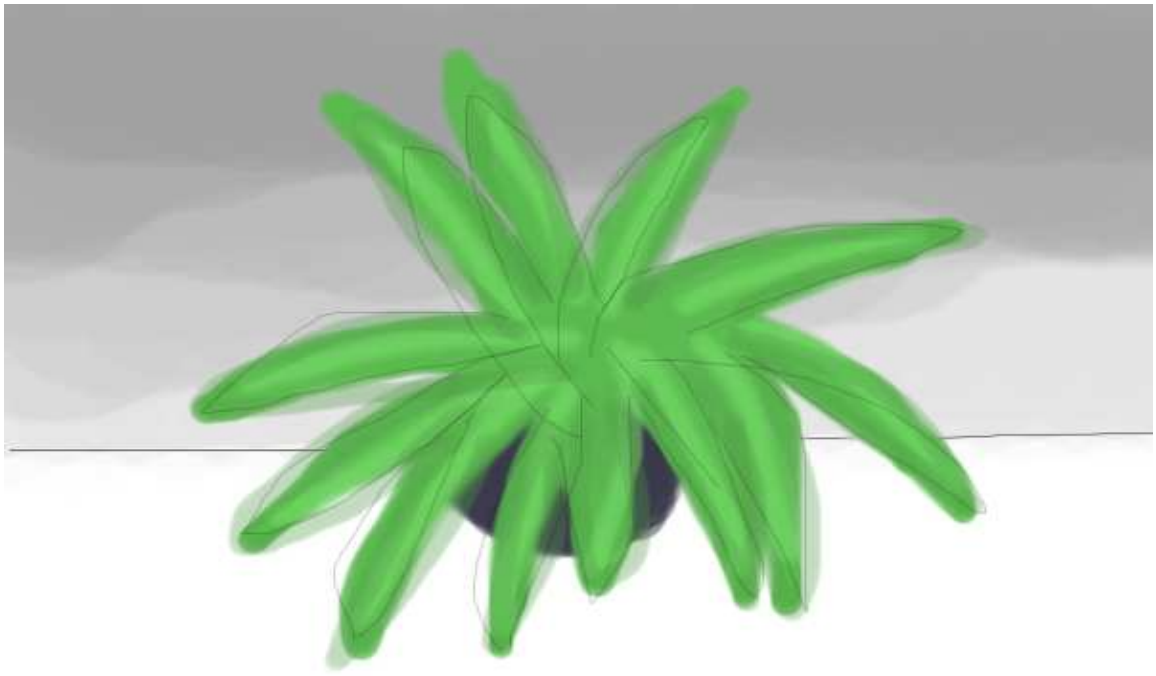
Independent variable is the level of the illumination level, which I changed.

Dependent variable is oxygen allocation, which depends on the illumination level.

# MATERIALS AND METHODS

## Materials

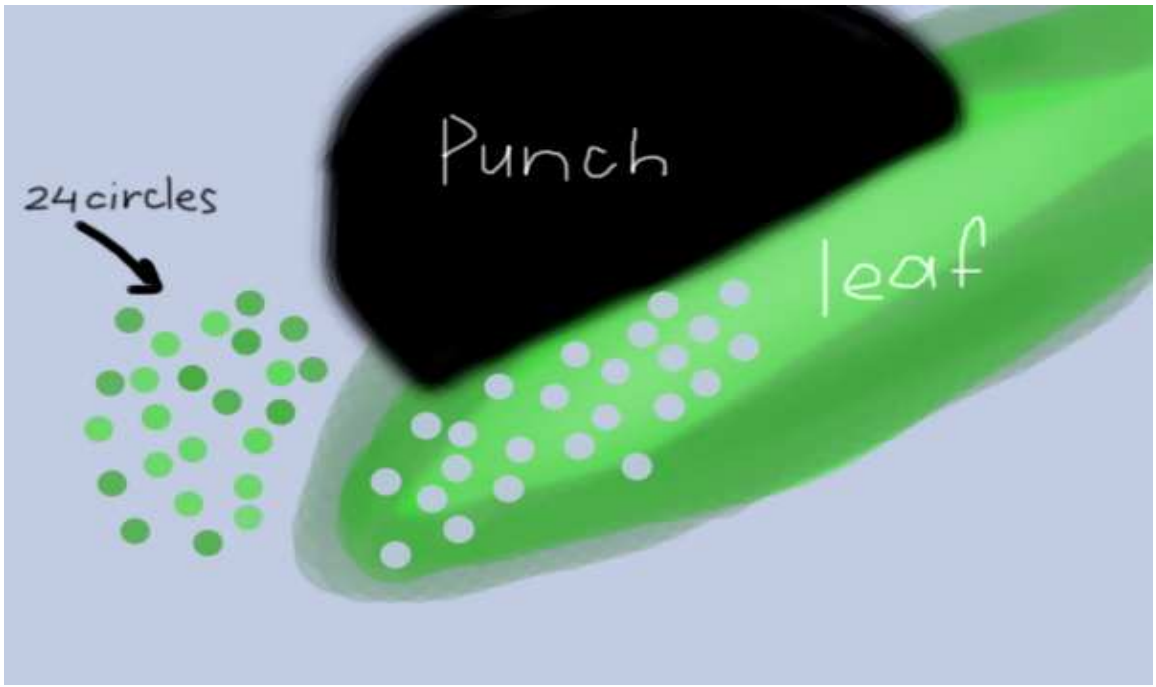
Punch, cups, a solution of baking soda 0.5%, medical syringes with the cylinder 10 ml, glass tubes, the lamp of 100 W, a box, the leaves of plants (Chlorophytum).

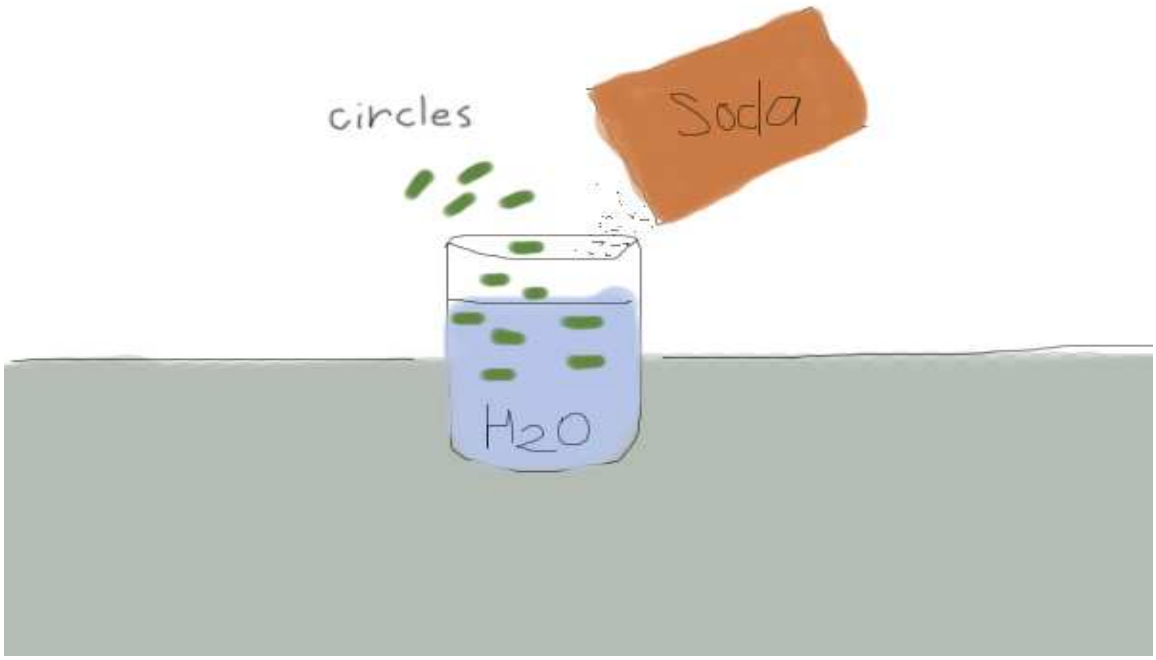


Chlorophytum

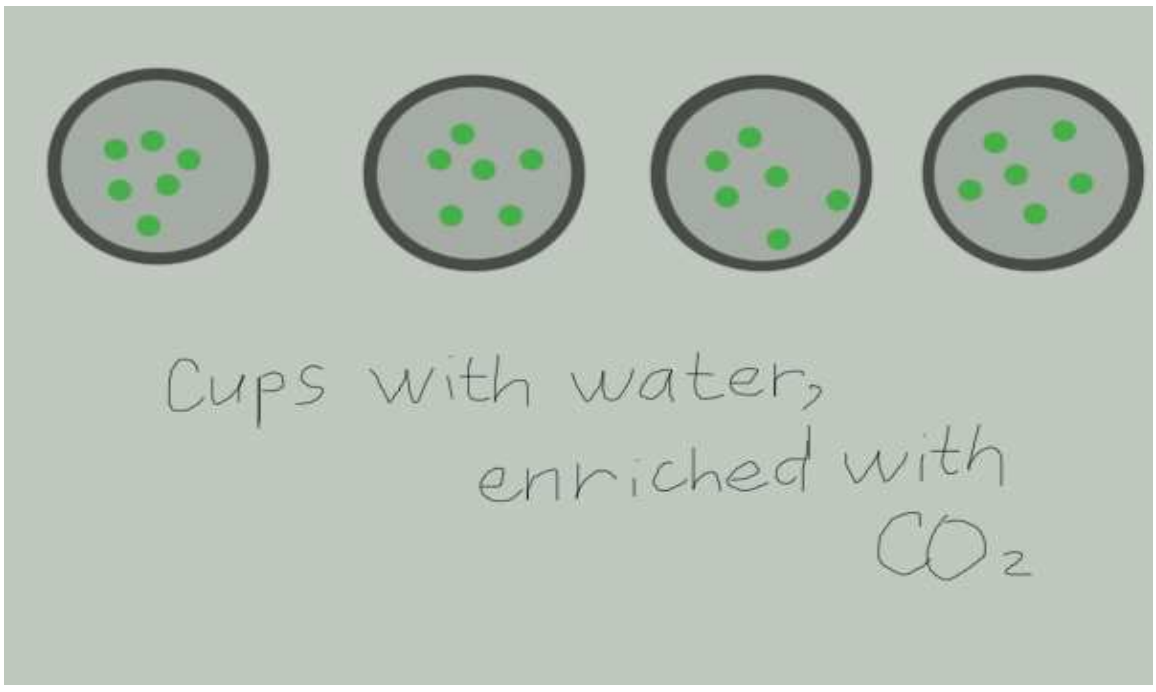
## Method

1) Make 24 circles from leaf uses punch and infiltrate them by water saturated with $CO_2$

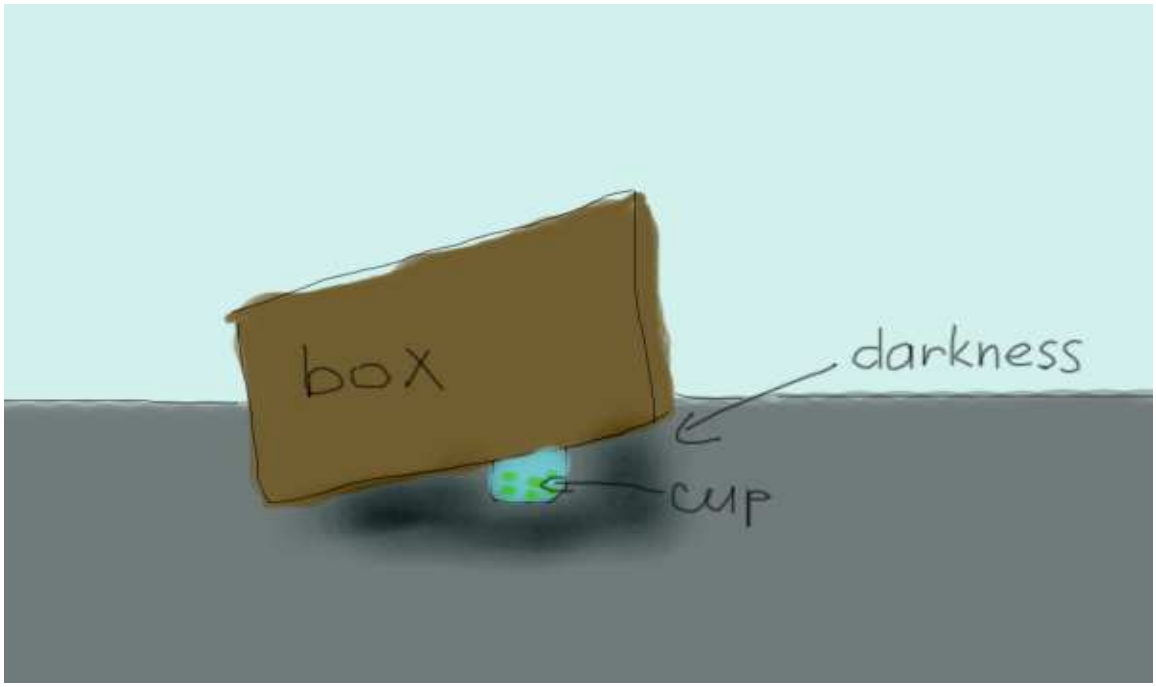




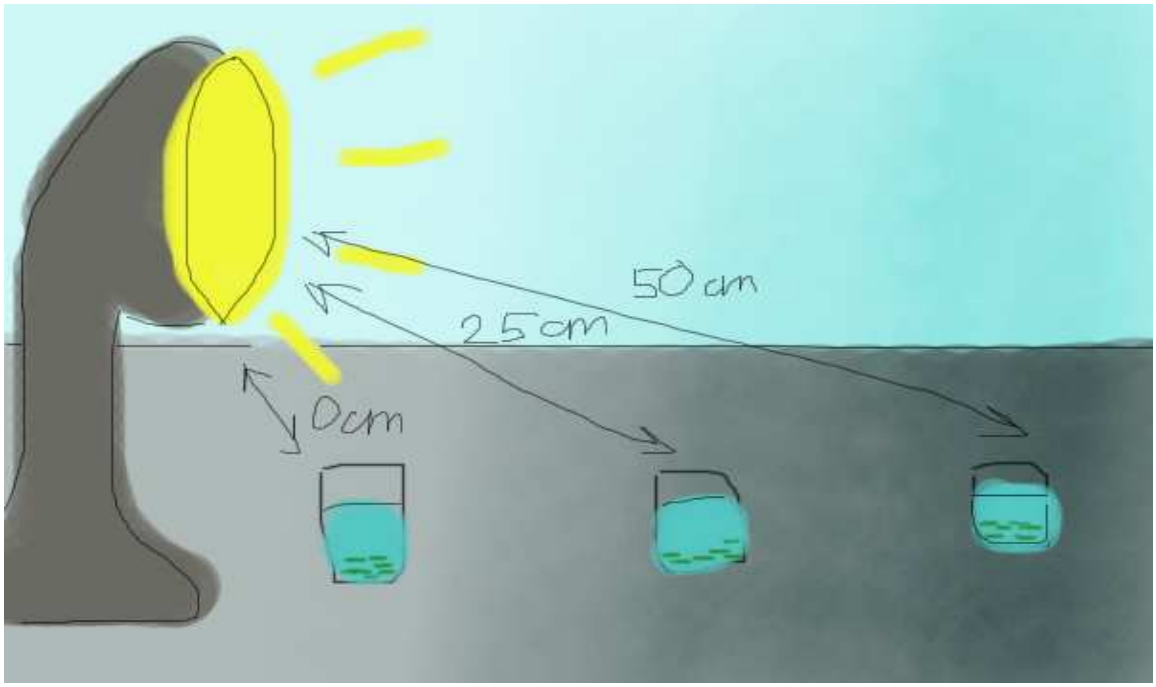

2) Infiltrated circles put for six pieces in cups with water, enriched with CO2.



3) One of the cups put in the darkness (control)…

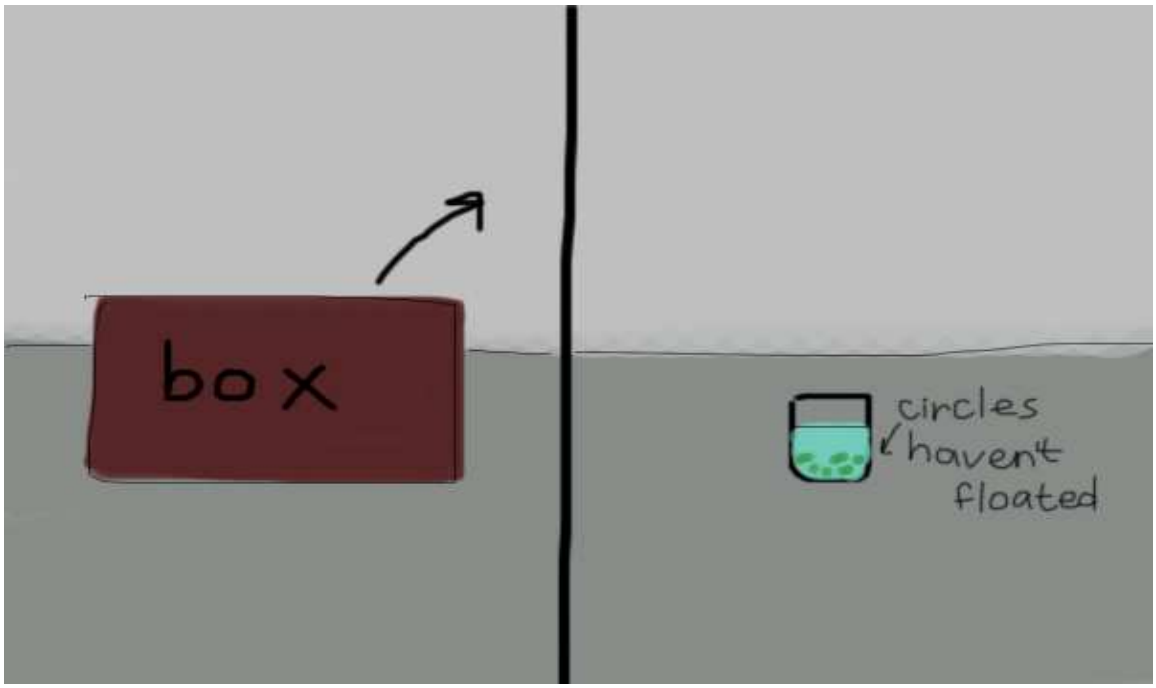



…others put up for the light at different distances from the source and count the time

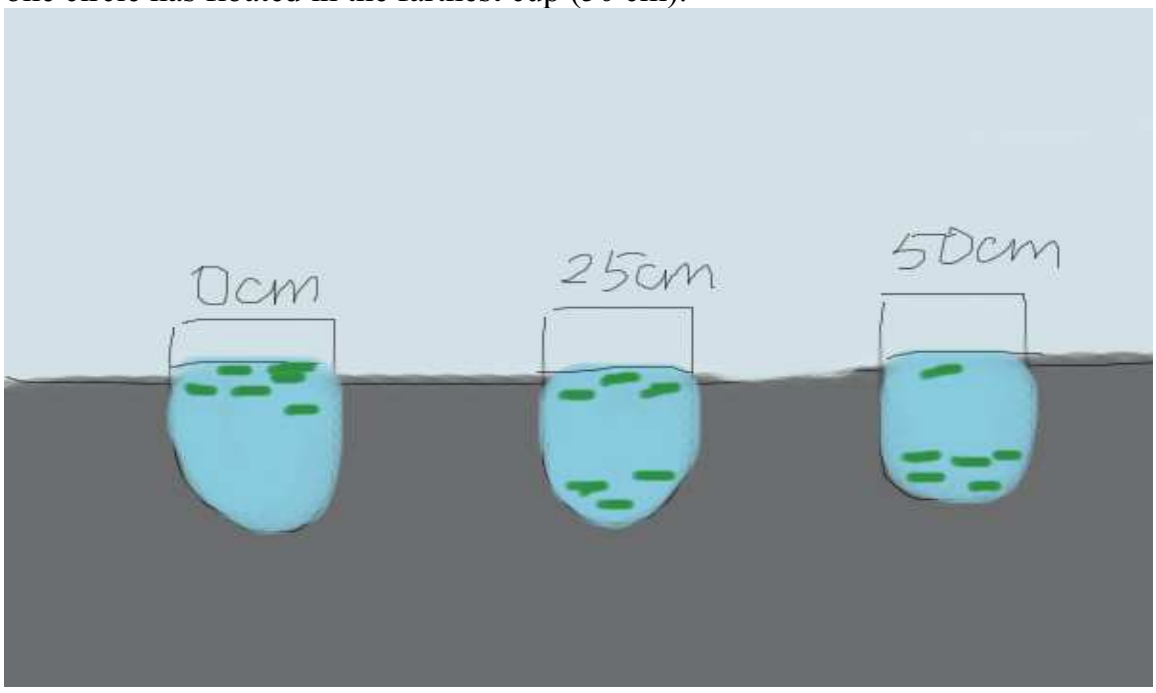


# RESULTS

Circles float up at different time depending on the light as a result of accumulation in intercellular spaces of the oxygen formed during photosynthesis.
I had spotted 45 minutes and then saw a result. Circles in the darkness haven't floated.




The circles which were the nearest with the lamp (0 cm) have floated almost every. The circles which were on the distance of 25 cm have floated only 3. And the only one circle has floated in the farthest cup (50 cm).



# DISCUSSION

## Data Analysis and Conclusion

Analyzing result of the experiment, I made a conclusion that $O_2$ wouldn't produce without light energy. The more intense the light, the more oxygen is produced. I proved this theory by my experiment.

## Evaluation

My experiment was made in the laboratory and it has a few weaknesses. Firstly, is that all conditions were unnatural and all was only a model how $O_2$ is produced in environment. Secondly, I might do the concentrate of $CO_2$ higher, than 0, 5%. Thirdly, lamp isn't a sun and I couldn't do all conditions in definite numbers. Fourthly, I had to tear off leaf of the Chlorophytum. Greenpeace doesn't like it. Fifthly, I had to use only leaf of Chlorophytum because leafs of other plants don't float.

Despite of these weaknesses I think that I prove that the amount of emitted oxygen depends on the amount of light energy. It is a very simple experiment and a very effective.

## Suggestions for improving investigation

In my view this experiment will be better if I do in natural conditions uses sun light. But perhaps there will be drawbacks with other conditions.