How Does Different Coloured Light Affect Plant Growth In Bean Plants

PURPOSE:

The purpose of this lab is to observe and compare the difference between how plants grow under white light (Group A), green light (Group B), and red light (Group C). This lab will show how different coloured light can affect the following factors in a plant like the stem length, the number of leaves and colour of leaves.

HYPOTHESIS:

Group C will have the most successful results because plants absorb wavelengths of 400-700, and red wavelengths are 640-680. Red wavelengths encourage stem growth, flower growth, and fruit production. Group A will grow the second most successful group because plants are well suited for white light absorption. Group B will be the least successful because the green chlorophyll in plants won't be able to pick up the green light well, and it will be reflected off the plant.

CONCLUSION:

- The average height of Group B (Greenlight) came out on top with an average height of 32.68cm
- Followed by Group A (White Light) with an average height of 29.77cm
- Followed by Group C (Red light) with an average height of 28.95cm.
- This proved our hypothesis wrong since we stated that group C would be on top and group B would be on the bottom.
- Even though group B came out on top based off height, their quality wasn't the best.
- They all looked unhealthy and a bit dried.
- Their roots were also noticeably thinner compared to the other 2 groups.

Group A

Group B

Group C

Final Observations

(Plants were put under coloured light on Dec 14, 2018)

****(For final results we exclude plants: A2, A3, A9, C2, C4, C10 due to plants B7, B3, B1 not germinating at all so we chose to remove plants A2, A3, A9, C2, C4, C10 because they had the worse results out of the group)****

Final Results	Group A	Group B	Group C
Final Average Stem Growth	29.77cm	32.68cm	28.95cm
Final Average number of leaves	2 Leaves	2 Leaves	2 Leaves
Average Health of plant overall	Healthy looking leaves, stem, roots.	Dry leaves and stem, roots are smaller and thinner compared to group A and C	Healthy looking leaves, stem, roots.

PLANT GROUP A (WHITE LIGHT) Final Result PICTURES

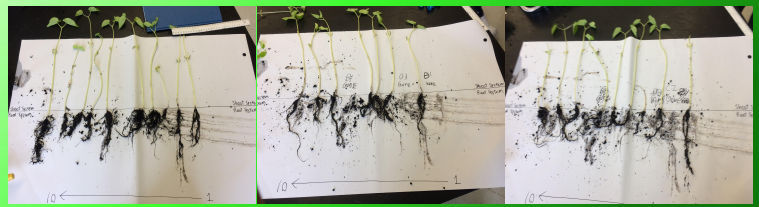
PLANT GROUP B (GREEN LIGHT) Final Result PICTURES

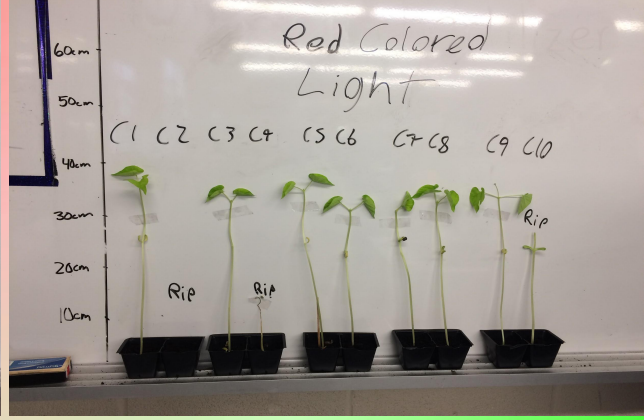
PLANT GROUP C (RED LIGHT) Final Result PICTURES

A-10 <- - - - - - - - A1

B-10 <- - - - - - - - B1

C-10 <- - - - - - - - C1





<u>*PLANT GROUP A (WHITE LIGHT) Final Result PICTURES*</u>

<u>A-10 <- - - - - - - - - - - - A1</u>

<u>*PLANT GROUP B (GREEN LIGHT) Final Result PICTURES*</u>

<u>B-10 <- - - - - - - - - - - - B1</u>

<u>*PLANT GROUP C (RED LIGHT) Final Result PICTURES*</u>

<u>C-10 <- - - - - - - - - - - - C1</u>

S.T.S.E.:

- **Science:** Knowing how specific lights and wavelengths affect plant growth will lead to new technologies to aid in plant growth. Indoor plant facilities can adapt better lights suited for plant growth to get better plant qualities in a shorter amount of time. For example, new lights could be developed specifically for plant growth that help in stem growth, flower growth, or fruit growth.
- **Technology:** Further Advances how plants are grown and where plants are grown. Knowing information such as which lights benefit plants most can help many countries that don't have the proper conditions to grow crop year long may allow them to now do so during harsh weather conditions that may lurk outside. It gives people that comfort to not be worried if the crop is enough for the winter season.
- **Society:** Knowing how plants grow in different lights can help with businesses that grow plants indoor because it may not be as ideal to grow these certain plants outside in a typical garden because of outcome, for example the marijuana industry that is vastly growing in Ontario since it has been legalized. When growing cannabis indoors, growers can focus their attention on a smaller number of plants, monitoring growth patterns, nutrient needs and so on with ease. This hands-on approach has allowed growers to perfect their practice in controlled environments, using a variety of techniques to increase potency, perfect flavor and improve appearance all within a smaller space. Allowing them to monitor which colour of light is the best for growing marijuana.
- **Environment:** Knowing how effective plants can be while growing underneath coloured light can benefit our environment because plants being grown underneath coloured light might have Some pros that can help our environment for example Ultraviolet light produces better growth when being used and our environment could be lacking that due to air pollution all over the world. Another example could be violet light because it enhances the colour, taste, and aroma of plants. This could be used to enhance the properties of plants to make them more appealing to people.

Compact **fluorescent bulbs** are available in warm/**red**(2700 K), full spectrum or daylight (5000 K) and cool/**blue** (6500 K) versions. Warm **red** spectrum is recommended for flowering, and cool **blue** spectrum is recommended for vegetative growth. Usable life span for compact **fluorescent** grow lights is about 10,000 hours.