

JBI101: How Do Plants Grow?



ONE OF THE FOUR CARNEGIE MUSEUMS OF PITTSBURGH



@carnegiescictr



Facebook.com/CarnegieScienceCenter

Abstract

The goal of my project was to determine what the effect of sunlight is on the growth of bean plants. I planted 20 bean seeds and exposed them to different amounts of sunlight on north, south, east and west facing windowsills in my home. I measured the height of each plant once a week for 10 weeks. The bean plants which were placed on the south facing windowsills were taller than those on the other windowsills at the end of 10 weeks. I conclude that south-facing windows provide the best natural light for plant growth.

Research Question

How do Plants Grow?

CARNEGIE
SCIENCE
CENTER

ONE OF THE FOUR CARNEGIE MUSEUMS OF PITTSBURGH

What is known?

- Plants use sunlight to produce energy using photosynthesis
- South facing windows are known to be best for plant growth
- East and west facing windows are said to be the next best

What was I trying to find out

- Is this commonly believed assumption true at my home during the winter months?
- Which windowsill should I put my plants on to make them healthiest?

My research question

- Does plant growth as measured by plant height differ based on the direction the sunlight comes from?

My hypothesis

- Plants placed in south facing windows will grow taller than plants placed in windows facing other directions.



Photo source: Internet,
stock image from Microsoft
Office

Procedure

- 20 lima bean seeds in Miracle Grow potting soil in recycled cardboard egg cartons
 - 4 on each windowsill (north, south, east and west)
 - 4 under a controlled LED grow light
- Plant height measured weekly with a ruler
 - Data collected for 10 weeks
- Variables
 - Independent – Light source
 - Dependent – Plant height
 - Control – LED grow light plant group

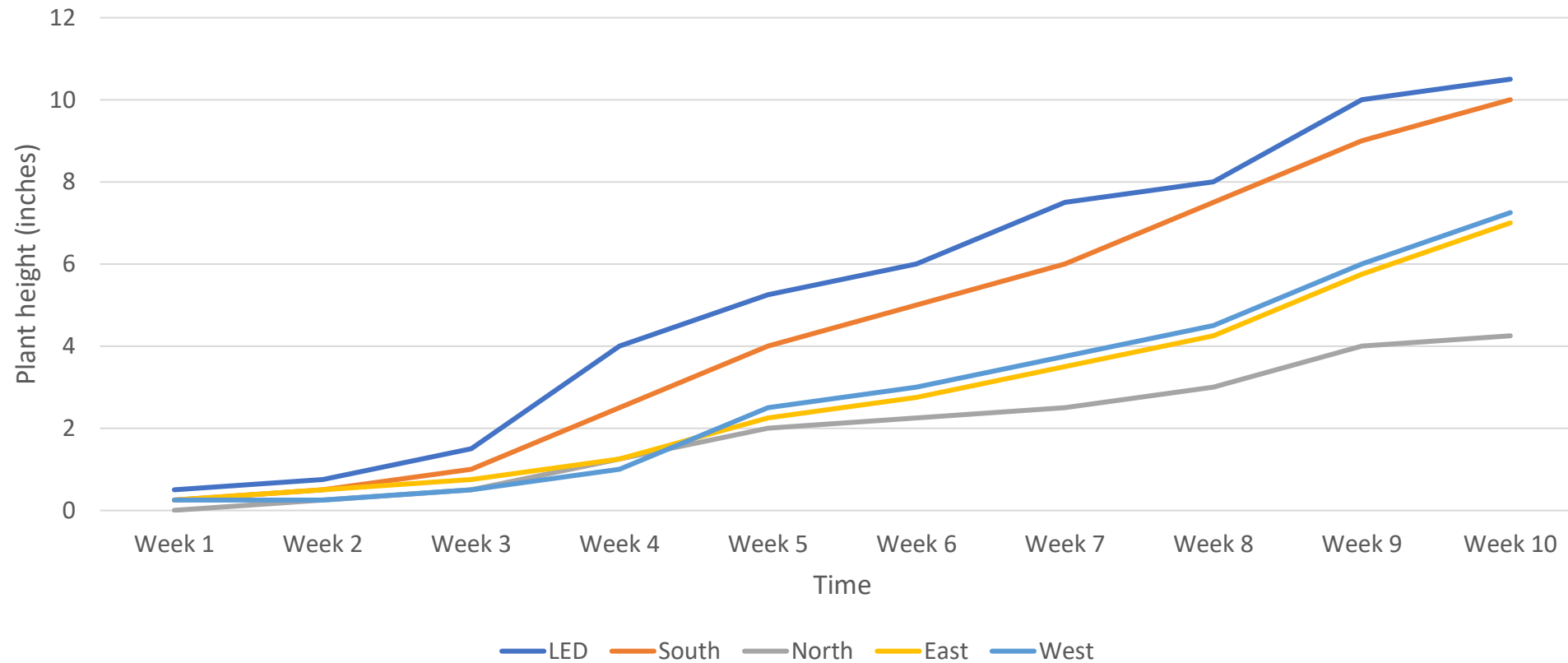
Results

- 1. The table shows the average height of the plants in each location**
- 2. All measurements are recorded in inches**
- 3. The plants grew at different rates**

	LED	South	North	East	West
Week 1	0.5	0.25	0	0.25	0.25
Week 2	0.75	0.5	0.25	0.5	0.25
Week 3	1.5	1	0.5	0.75	0.5
Week 4	4	2.5	1.25	1.25	1
Week 5	5.25	4	2	2.25	2.5
Week 6	6	5	2.25	2.75	3
Week 7	7.5	6	2.5	3.5	3.75
Week 8	8	7.5	3	4.25	4.5
Week 9	10	9	4	5.75	6
Week 10	10.5	10	4.25	7	7.25

Results continued

Plant Growth over Time



Interpretation

What do the results mean?

- My background research and commonly held beliefs indicated that plants in south facing windows would grow best
- The plants in the south facing window grew taller than the plants in the other windows

Possible errors

- It was an unusually cloudy winter which could have stunted plant growth

Surprises

- I did not expect for the plants under the LED grow light to grow taller than the plants in the windows

Conclusions

How do Plants Grow?

CARNEGIE
SCIENCE
CENTER

ONE OF THE FOUR CARNEGIE MUSEUMS OF PITTSBURGH

- **Conclusion versus hypothesis**
 - YES! The data supported my hypothesis that plants placed in south facing windows will grow taller than plants placed in windows facing other directions.
- **What do the results mean?**
 - I should I put my plants on a south facing windowsill to make them healthy.
 - South facing light is superior to north, east and west facing light for plant growth.
- **Applications**
 - Gardeners should make sure their house plants have as much south facing light as possible.
 - Big farmers should make sure their crops have south facing light.

Bibliography



**Thank you
from**

**CARNEGIE
SCIENCE
CENTER**

ONE OF THE FOUR CARNEGIE MUSEUMS OF PITTSBURGH

- "Green Pie In The Sky? Vertical Farming Is On The Rise In Newark." *All Things Considered*, 5 Aug. 2015. *Gale In Context: Middle School*, <https://link.gale.com/apps/doc/A425364351/MSIC?u=pl7321r&sid=MSIC&xid=45c78cde>. Accessed 8 Oct. 2020.
- "Photosynthesis." *Gale Middle School Online Collection*, Gale, 2020. *Gale In Context: Middle School*, <https://link.gale.com/apps/doc/BDXWRS440932179/MSIC?u=pl7321r&sid=MSIC&xid=89e7e18a>. Accessed 8 Oct. 2020.
- Prochnow, Dave. "Sunshine sticks: create a light system to keep houseplants thriving during the short days of winter." *Popular Science*, vol. 274, no. 2, Feb. 2009, p. 69. *Gale In Context: Middle School*, <https://link.gale.com/apps/doc/A208962198/MSIC?u=pl7321r&sid=MSIC&xid=e3dd8b78>. Accessed 8 Oct. 2020.
- Technische Universitaet Muenchen. "How do plants grow toward the light? Scientists explain mechanism behind phototropism." *ScienceDaily*. *ScienceDaily*, 28 May 2013. <www.sciencedaily.com/releases/2013/05/130528105946.htm>.
- "The Houseplant Encyclopedia." *Science News*, vol. 170, no. 6, 5 Aug. 2006, p. 95. *Gale In Context: Middle School*, <https://link.gale.com/apps/doc/A151188412/MSIC?u=pl7321r&sid=MSIC&xid=6de9131e>. Accessed 8 Oct. 2020.