Investigating how light intensity affects stomatal density in plant.

**Introduction**:

Investigating stomatal density is important because the stomata pores release oxygen, which is a crucial element for humans to breath in, and they are also the entranceways for . Light intensity levels can have a significant effect on photosynthesis rate, a process using sunlight, chlorophyll, oxygen and water to form glucose and oxygen, which is directly related the plant growth. More stomata pores on plant, result in more photosynthesis, investigating leaves from species of plant under different light intensities, will show if light intensity affects stomatal density. The significance with light intensities can be considered for humans’ planting with an intention of benefitting themselves or serving for the growth of plants.

I have lived in six different houses/apartments before for at least one year each, and the houses are either with a garden or have a playground where different plants grow on, so I am interested in investigating plants due to this personal attachment. Consequently, I always pay additional attentions to botanical topics as a connection to my life.

**Research question:**

How does light intensity affect stomatal density in plants?

**Independent variable**:

5 different light intensities/5 different locations with different light exposures

**Dependent variable**:

Stomatal densities

**Controlled variables**: What must you keep the same to make it a fair test?

|  |  |  |
| --- | --- | --- |
| Variable to be controlled | Reason for controlling the variable | How the variable will be controlled |
| Leaves from a specific type of plant | To maintain the constant from the same species | Collect the leaves from one plant |
| Clear nail polish | To observe the leaves clearly | Collect from the same nail polish bottle |
| Microscope clarity | To maintain the same resolution | Use the same microscope |

**Exploration:**

**Materials:**

One compound microscope with magnification up to 400x

Two microscope slides

One pair of forceps

One marker pen

Clear nail polish

One digital camera to capture microscope images

One type of leafy plant which can be found under different light intensities

One calculator

**Safety instructions:**

Chemicals in clear nail varnish.

Work in a well-ventilated space because it can cause headaches.

**Method:**

1. Find the suitable plant under five different light intensities to investigate and collect three leaves from each location.
2. Coat a layer of clear nail polish on both sides of leaf surface. Leave it to dry.
3. Carefully peel off the thin layers with clear nail polish from both sides of the leaf by using forceps.
4. Place the thin layer flatly on a piece of tape and tape it on the microscope slide.
5. Place the slide under the 400x magnification of microscope.
6. Count and record.
7. Replicate steps 2-6 twice using a different leaf from the same location.
8. Replicate steps 2-7 with leaves from the same plant from the four other different light intensity conditions.
9. Calculate for the average for each condition.

**Results Table:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Numbers of  Stomata Light Intensity | #Trial 1 | | | #Trial 2 | | | #Trial 3 | | | Average | | |
| 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Very Weak |  |  |  |  |  |  |  |  |  |  |  |  |
| Weak |  |  |  |  |  |  |  |  |  |  |  |  |
| Moderate |  |  |  |  |  |  |  |  |  |  |  |  |
| Strong |  |  |  |  |  |  |  |  |  |  |  |  |
| Very Strong |  |  |  |  |  |  |  |  |  |  |  |  |

**unit in numbers of stomata**

**Citations:**

“The Effect of Light Intensity on Plant Growth.” *Hunker*, www.hunker.com/12340735/the-effect-of-light-intensity-on-plant-growth.