

## >>> Bouncing Ball Investigation <<<

### Aims:

In This experiment, I'm going to discover how the surface affects the height that a of a tennis ball

### Introduction:

All green plants are able to use light as a source of energy. Chlorophyll (green coloured pigment in leaves) absorbs light and changes it into chemical energy, which is used to power all the chemical reactions that go on in a plant cell. This is called photosynthesis.

Photosynthesis is the process of producing glucose from sunlight, which takes place in the leaves. The 3 features of the leaves are:

- 1) They are thin and flat to provide big surface area.
- 2) The palisade cells near the top of leaves are packed with chloroplasts.
- 3) The Guard cell controls the movement of gases going in and out.

The four things needed for photosynthesis are: Light energy, Chlorophyll, carbon dioxide and water.

The rate of photosynthesis is affected by the following reasons: the amount of light energy, the amount of carbon dioxide and the temperature. Carbon dioxide gets into the leaves by diffusion through the tiny holes under the leaf called stomata. Diffusion is a vital part of photosynthesis because if carbon dioxide couldn't get into the leaves photosynthesis would not occur.

Photosynthesis also releases the gas, oxygen. Plants are the most efficient converts of the sun's energy and all other living organisms depend on them as a source of life.

The equation for photosynthesis is:  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

### Photosynthesis:

My prediction for this practical is that the harder the surface, the higher the ball will bounce. The softer the surface, the lower the ball will bounce.

### Equipment:

- 1 Tennis Ball
- 1m Rule
- Different Surfaces

### Equipment Set Up:

### Safety:

- Do not throw the ball around, as it may injure someone.
- Only drop the ball when not many people are around.
- Basic lab rules apply

In this experiment there are only few dangers, such as ball might injure someone. Though basic Lab rules should be followed.

### FAIR TEST:

To maintain a fair test we have to make sure that we use the same:

- Tennis Ball
- Person Dropping The Ball

Also repeating the test 3 times, to make sure that the results are reasonable.

### Method of Experiment:

1. Place 1 m Rule on surface, and keeping it upright.
2. Dropping the ball from the selected height.
3. As soon as the ball reaches its highest position take the measurements.
4. Turn light on and begin timer for 2 minutes.
5. During allocated time count number of bubbles coming off.
6. Record results in table shown below.
7. Record steps 4-7 for all measurements.

### Variable:

During the experiment, I will change the distance of light from the plant, to see how it affects the rate of photosynthesis. I will do this by:

- Changing the length that the light is from the test tube, I will move at 10,20,30,40, and 50.

### Results

Drop Height	Bounce Height
100	61
90	51
80	48
70	44
60	40
50	30
40	22
30	12

### Conclusion:

From the results and graphs that I have gathered I now know that an increase in light intensity certainly does increase the rate of photosynthesis. Also, the relationship between light intensity and the rate of photosynthesis was non-linear. From one of the graphs there is a best-fit curved line. This means that the rate of photosynthesis increases at an exponential rate.

The greater the light intensity the more intense photosynthesis was, the greater the distance, the slower the rate of photosynthesis. Photosynthetic rate is being limited by certain factors such as carbon dioxide and temperature. As light intensity increases further, these factors limit the rate of photosynthesis even more until photosynthesis is completely limited and the graphed line become horizontal. This is when photosynthesis is being carried out at a constant rate.

### Evaluation:

Overall, I would state the experiment as a success since my predictions were supported by my results. My prediction needed to be brief, sensible and logical.

While performing the experiment, the piece of pondweed did not photosynthesise at a steady rate, even when the distance from the plant to the light source was kept a constant. This is evident because my graphs were not all exactly the same this was why it is better to carry out the experiment more than once, if this was not done the results may not go down at a steady rate.

While the number of oxygen bubbles was being recorded, the rate at which the plant was

photosynthesising had increased several times. This may be due to the poor circulation of sodium hydrogen carbonate at the beginning of the experiment. Carbon dioxide may have initially limited the rate of photosynthesis. Almost all readings were in correlation with each other. A large factor in determining data accuracy is the amount of human error during experiments. To improve the accuracy of the results, the readings would have to be taken several more times.