

On-line Science Simulations – Waterweed Teacher Instruction**Task 1**

Instruction 4. Students might benefit from allowing the experiment to run for its full 30 s when they start their investigation, but little will be achieved thereafter and thus 'fast forward' will be helpful.

Instruction 5. The number of runs is not crucial. Enough to obtain a meaningful average is all that is required. Students will need to adopt the essential laboratory practice of recording and calculating their averages.

Instruction 6. Some students may care to use values in addition (or alternative) to the light intensities suggested to improve or confirm the validity of their graphs.

Instruction 7. The shape of curves obtained should conform generally to the following pattern: a sharp rise followed by a tailing off.

Instruction 8. Students should be able to deduce that, at lower light intensities, the rate of photosynthesis increases rapidly with increased light intensity. A point of 'light saturation' is then reached where a further increase in light intensity does not increase the rate of photosynthesis, which remains constant.

Task 2(a)

This task complements Task 1, and the graphs generated are very similar in general appearance.

Instruction 6. Again, there may be some benefit in students taking readings at a larger number of CO₂ concentrations than those suggested.

Instruction 8. Graphs should conform in general to the following model: an initial increase followed by a levelling off.

Instruction 9. The rate of photosynthesis increases with increased CO₂ concentration up to a point at which it becomes constant. A consideration of the possible reasons for this may lead to the introduction of the concept of interacting limiting factors.

Task 2(b)

Instructions 1 & 2. Further investigations could be carried out with different values of light intensity and CO₂ concentration.

Instruction 7. The bar chart should show that, *in this particular instance*, the rates of photosynthesis in white, red and green light are in the approximate ratio of 20 : 12 : 1.

Instruction 8. The bar chart shows that the plant photosynthesises well in red light, but not in green light. Students may be able to deduce that a leaf appears green because it is reflecting back to the observer that component of white light which it does not use for photosynthesis.

