



Lifelong Learning Programme



Country: IR+RO

Schools: CastleKnock College Dublin + Liceul Teoretic Iancu C. Vissarion , Titu

Software: M +MD, excel , GeoGebra

Subject:

Chemistry

Biology

Maths

Topic:

Chemistry :

Monitoring the rate of production of oxygen from hydrogen peroxide using manganese dioxide as a catalyst and plot results in GeoGebra

Biology :

Monitoring the rate of production of oxygen obtained by the process of photosynthesis by heat from the environment and its interpretation using GeoGebra

Maths :

The points intersection of curves using classical methods and GeoGebra

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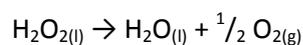
Cooperation duration: 3th March 2014 – 31st May 2014

Examples:

Chemistry :

Theory

Hydrogen peroxide decomposes into water and oxygen as follows:



This occurs much too slowly to be monitored. However, manganese dioxide acts as a suitable catalyst, and the reaction occurs at a measurable rate.

Chemicals and Apparatus

Hydrogen peroxide (20 volumes)  

Powdered manganese(IV) oxide 

100 cm³ graduated cylinder

Beehive shelf

Large trough

Conical flask with suitable stopper and delivery tube

Stop-clock

Small test tube

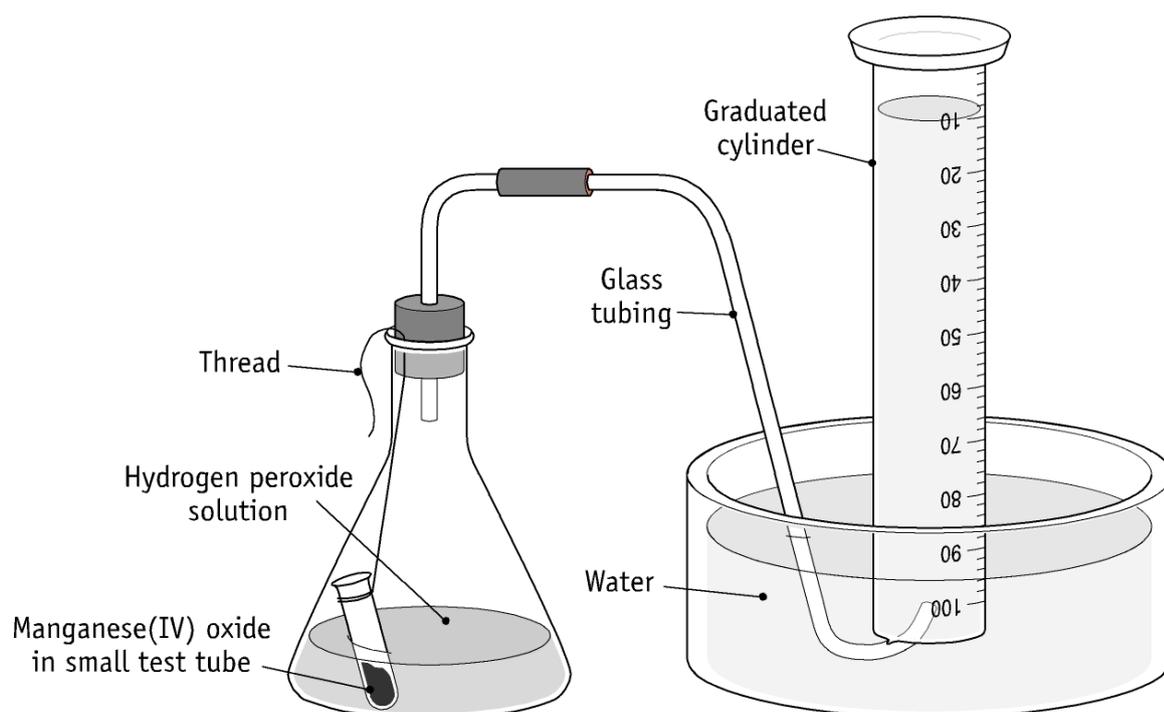
Thread

Teat pipette

Procedure

NB: Wear your safety glasses.

1. Measure out 5 cm^3 of hydrogen peroxide and dilute to 50 cm^3 with water. Place it in the conical flask.
2. Weigh about 0.5 g manganese(IV) oxide into the small test tube, and use the thread and stopper to suspend the test tube in the conical flask. Avoid contact between the manganese(IV) oxide and the hydrogen peroxide.
3. Place sufficient water in the trough to allow the graduated cylinder to be filled with water and inverted over the beehive shelf. Using a teat pipette, inject air into the graduated cylinder until the water level is at the 10 cm^3 mark.
4. Arrange the delivery tube for the oxygen produced to be collected in the graduated cylinder by displacement of water.



5. Loosen the stopper momentarily to allow the thread to fall into the flask and shake vigorously, thus bringing the manganese(IV) oxide into contact with the hydrogen peroxide. The stop-clock should be started as this contact is made. Record the total volume of gas in the graduated cylinder every 30 seconds. Readings should be taken at eye level.

6. Present the results in the following table:

Time (min)	Total volume of gas (cm ³)	Total volume of oxygen(cm ³)

7. Draw a graph of total volume of oxygen against time, putting time on the horizontal axis.

Biology:

Theory:

The study of light intensity on the rate of photosynthesis .

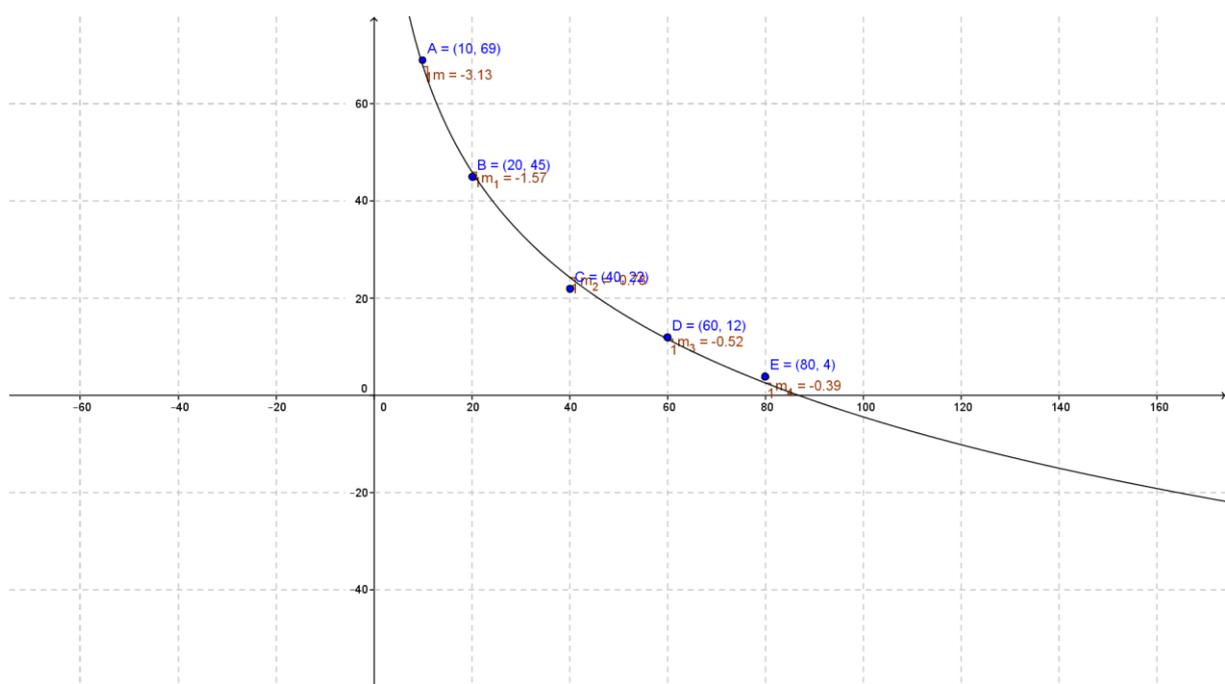
Putting in evidence of photosynthesis – bubble method

The necessary utensils:

- base
- double socket
- support clamp tubes
- long rod
- glass wand
- reflector lamp

A branch of elodea is cut obliquely at the basement and is insert with top down in a tube with tap water. To see more easily release oxygen the branch is fixed to the rod , so that the cut part to be to 2-3 cm the walls of the tube. The branch tube placed in natural light or in front of a light bulb of 100-150 watts. After 2-3 minute through the cut side begin to emitted gas bubbles.if the release of bubbles does not occur upon exposure to light , it makes a more oblique cutting , if the bubbles are too numerous, the cutting is made less oblique. Putting out oxygen removed through the cut branche is explain this : the oxygen that is formed in the process of photosynthesis broadcasts in the intercellular spaces and is eliminates in the form of bubbles through the cut side where intercellular spaced communicate with outside. Besides oxygen these bubbles may contain nitrogen and carbon dioxide.

Plot in GeoGebra



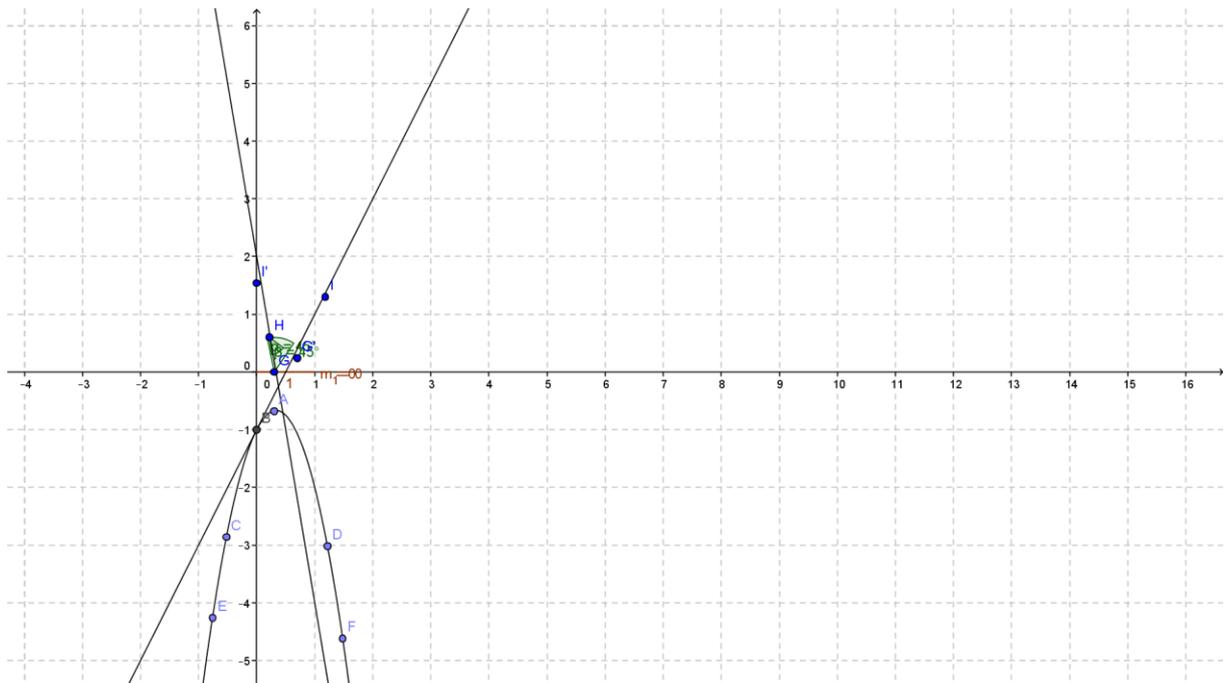
Maths

Theory :

Functions

Quadratic functions

Tangent , area , slope on the graph



The students give answers with GeoGebra and without for Maths and Chemistry . Even then they late , the answers are uploaded on itslearning . Not only the participating students in Siauliai got answers , many others are involved . I was a nice experience for Romanian students to work with GeoGebra and to see the results more exactly on the graph .