

ScienceWord, PagePlayer and Symtone

Three Outstanding Tools for:

Word Processing, Public Presentation & distance education

Working, Learning & Teaching

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Introduction

The speed and complexity in the preparation of a scientific document has, in recent times, risen dramatically in the areas of research, education, digital library, documents indexing and Internet applications. Similarly, the increasing volume of academic papers, tutorials, test papers in mathematics, physics, chemistry and all kinds of teaching materials have necessitated the use of more powerful and comprehensive tools for **Word Processing, Public Presentation and Distance Learning**.

As a matter of fact the complicated nature and structure of scientific documents has been one of the most haunting problems for developers and educators alike currently. In such a demanding climate, how to realize complete office automation, full-scale science book digitalization and resolution of online transmission and indexing have inevitable been the most urgent issue on the agenda for future development.

I - ScienceWord software

I.1-The problem on word processing

Normally a word processor is used for typing, formatting, and possibly bringing additional modifications to a document before it is saved/or printed. When dealing with a scientific document the situation becomes entirely different. Difficulties set in because such documents by their very nature, would contain mathematical formulae, chemical formulae, geometrical drawings, graphical representations,.... etc. To find a way around this difficulty universities as well as other tertiary institutions resort to the use of some scientific word processors.

Despite the above apparent relief typing scientific documents remains a real brainteaser, necessitating the combined use of ordinary word processor and specialized scientific editors. Even this leads invariably to a not entirely satisfactory result For this reason several potential users, including lecturers, chemical engineers, medical practitioners and many more, still exhibit signs of an aversion for typing scientific documents.

I.2- ScienceWord to the rescue providing an overall word processing solution - ICT teaching and learning tool

Today ScienceWord is the only software that offers overall word processing solution in the production of scientific and technical documentation, making it possible to combine and integrate words, formulae, graphics, curves and logic diagrams perfectly in one document. ScienceWord will take the user to a brand new era of complete digitalization and automation in the fields of

science and education in general. In fact, ScienceWord is an outstanding software for word processing, with unequalled features long awaited by the scientific community. Not only does it realise the processing of ordinary texts as is done in most traditional programs, it also greatly facilitates the processing of complex scientific and technical documents of all types, incorporating straight forward implementation of mathematical formulae, drawings and dynamic constructions, chemical, biochemical and pharmacological structures in both 2D and 3D as well as graphs of functions on provision of data or analytic expressions.

. Arithmetic manipulations such as long divisions in a format usable by basic school pupils are also available. In line with Senior High School and Tertiary level curricula, scientific apparatus drawings for physics, chemistry and biology experiments together with circuit diagrams indispensable for electrical and electronic documentation are also efficiently dealt with in ScienceWord. The software enables also exchanges and network research for all kinds of documents. ScienceWord has indeed come to meet the expectation of those who desire to have a word processor, in which tasks are easy to carry out without the need for any in-depth previous knowledge.

ScienceWord documents are convertible into PDF, HTML, PS and EPS formats, very useful in scientific research and publishing. Additionally, ScienceWord recognizes and takes as objects all versions of MS Word, Excel, PowerPoint, ChemDraw , etc. and opens directly all MS Word (97 – 2003) documents

II - PagePlayer software

II.1-The problem of managing presentation documents


It is usual to make use of a software for the purpose of making presentations at symposia, conferences, project presentations, theses defence or normal lectures. This type of software that uses slides often requires a big screen where projection can take place with of course some animations to make a transition between the various parts of a subject under presentation: such a usage facilitates an understanding, legibility and notes taking for the listeners. Until recently, the real problem confronting all users of presentation software was the amount of time that must necessarily be devoted to the making of slides. Animation of a slide containing an ordinary text would require the creation of several text boxes, which inevitably takes a lot of time. The issue becomes more complex when it comes to designing slides containing a scientific text with mathematical formulae, chemical formulae or macromolecules; objects such as geometrical drawing, function, electronic and mechanical graphs....., etc

II.2- PagePlayer to the rescue providing an overall presentation solution

PagePlayer is a new generation of presentation software which simplifies on the one part: Concept, presentation and animation of slides of various types made up of ordinary texts, mathematical formulae, chemical bonds including macromolecules, two dimension and three dimension graphical representation, geometrical drawings, usual arithmetic operations of primary and secondary standards, experimental tools in physics and chemistry..... etc... and on the other part: concept and animation of geometrical and dynamic constructions including all plane transformations (translation, rotation, symmetry, homothetic). PagePlayer has achieved not only once and for all, problems linked with conception and animation of any presentation but has provided an educational tool of inestimable value for scientific people at all levels including students.

Outlined below are some functions that make PagePlayer not only a revolutionary software but also unique one at that.

- i. Writing of mathematical formulae takes place exactly as in ordinary text with an automatic passage to a new line.
- ii. Chemical bonds are carried out in the same way as done when drawing with a pen
- iii. The flexibility of the two dimensional and three dimensional coordinates systems simplifies graphical representation under all shapes required.
- iv. Geometrical construction is carried out with an amazing simplicity because all the necessary tools for conception are automatically available as soon as the corresponding elements of the plane are selected.
- v. A graphics library is available to store drawings and images for a further use.
- vi. The possibility of animating in an independent manner, the selection of any part of the text for differential animation (involving mathematical or chemical formulae) not only simplifies the animation of the text under all shapes wanted, but also make it very flexible animation sequences.
- vii. The possibility of writing or drawing in full screen mode facilitates corrections during presentation.
- viii. Not only PagePlayer supports the insertion of multimedia files like sounds and video, but also the insertion of macromedia file like Flash; and make it possible to read them without any previous installation of multimedia or macromedia players!

- ix. You can record with the Multimedia record buttons  any PagePlayer presentation including all actions taken on the screen.
- as video (avi.) file
 - as the complete internet package: video (avi.), HTML file including sound and images with all the sequences (slide to slide).
- x. The ability to animate objects and to explore with PagePlayer solutions to scientific questions widens considerably the field of application of this educational tool.

PagePlayer files are convertible into PDF, PS and EPS formats, very useful in scientific research and publishing. Besides PagePlayer recognizes and takes as objects all versions of MS Word, Excel, PowerPoint, ChemDraw.

III - ScienceWord and PagePlayer come from a new theory

Any document typed with a computer can be classified as linear or non linear document type. The linear or non linear character of a document is identified by the structure of the basic elements of the said document. When a well ordered structure exists between the basic elements of a document, such a document is said to be of a linear type. Furthermore, in a linear document type, there are only basic elements; no complex elements exist. All traditional documents are of a linear type. In contrast a non linear document type is not only made up of basic elements, but also of complex elements (for example CH_3). On the spur of a logical behavior, the basic elements which make up the complex elements do not appear again under the form of a well ordered

structure, but appear under a much diversified forms as Down-up (for exemple $\overset{\text{C}}{\text{H}_3}$), Left-right

(for exemple H_3C), Insertion in batches (for exemple $\text{H}_2\text{N}-\text{CH}-\overset{\text{O}}{\text{OH}}$), etc. The basic

$$\left(\begin{array}{c} \text{H}_2\text{N}-\text{CH}-\overset{\text{O}}{\text{OH}} \\ | \\ \text{CH}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array} \right)$$

element will be added when the cursor moves forward several characters. There are various mathematic logic relationship in a non linear document, including formulae, geometric graphs, molecule hierarchical graphs, electronic graphs among others. In addition to the sequential relationship orientation, nesting and recursion relationships can also be found. In this type of document, elements structurally maintain between themselves, risky and unpredictable

diversified forms. It is for this reason that this category of document is termed a non linear type. The linear type document is only the expression of the logical shapes whereas a non linear type document is the expression of logical shapes as well as logical behavior. Scientific and technical documents are complex documents made up of a number of formulae, graphics, curves, logical graphicsetc. They are by far the best examples of non linear type documents.

Non linear technique that constitutes the basic theory of ScienceWord and PagePlayer enables one to achieve once and for all the typographical arrangement of the simple text, mathematical formulae, chemical formulae, symbols, graphics, curves etc.

IV- Elements of scientific documents

The education sector generally including technical and professional institutions, has some very challenging needs with respect to word processing and public presentation. Scienceword and PagePlayer cover very significantly those needs. Here are few examples of their potentialities:

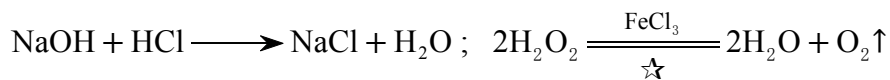
- Typing under varied forms of arithmetical calculations as illustrated below:

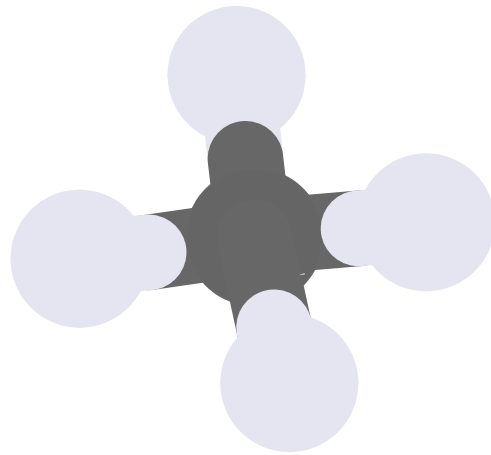
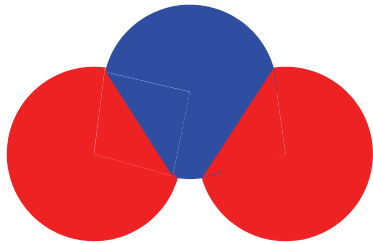
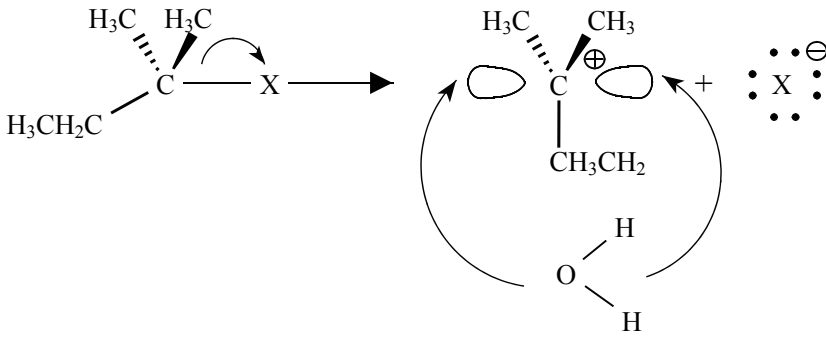
| | | |
|--|--|--|
| $\begin{array}{r} 7 \quad 2 \quad 8 \quad 9 \\ 9 \quad 8 \quad 7 \\ + \quad 6 \quad 5 \quad 4 \\ \hline = \quad 8 \quad 9 \quad 3 \quad 0 \end{array}$ | $\begin{array}{r} \quad \quad \quad 6 \quad 7 \quad 5 \\ \quad \quad \quad x \quad \quad 4 \quad 3 \\ \hline \quad \quad \quad 2 \quad 0 \quad 2 \quad 5 \\ \quad \quad \quad 2 \quad 7 \quad 0 \quad 0 \\ \hline = \quad 2 \quad 9 \quad 0 \quad 2 \quad 5 \end{array}$ | $\begin{array}{r} \quad \quad \quad \quad \quad \quad 5 \quad 6 \\ 9 \quad 7 \quad \sqrt{\quad} 5 \quad 4 \quad 4 \quad 3 \\ \quad \quad \quad \quad \quad \quad 4 \quad 8 \quad 5 \\ \hline \quad \quad \quad \quad \quad \quad 5 \quad 9 \quad 3 \\ \quad \quad \quad \quad \quad \quad 5 \quad 8 \quad 2 \\ \hline \quad \quad \quad \quad \quad \quad 1 \quad 1 \end{array}$ |
|--|--|--|

- Typing of mathematical formulae as illustrated below:

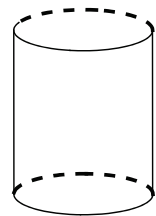
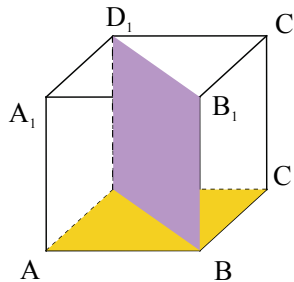
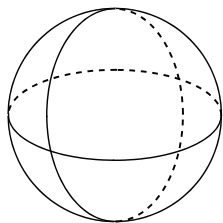
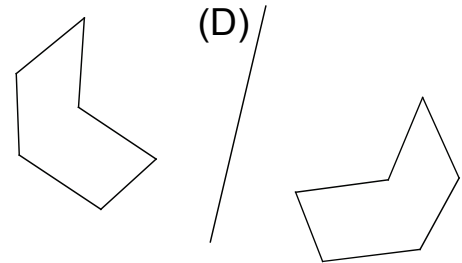
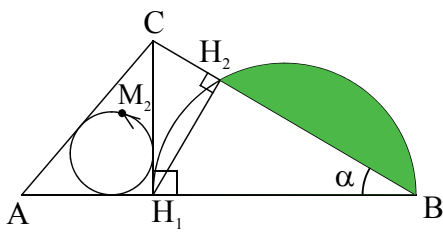
$$f(x) = x^2 + \frac{\sqrt{x}}{\sqrt[3]{x} + \frac{1}{x}} - \int_0^x (t - \sin(t))^2 dt$$

- Typing of chemical formula and editing macromolecules as illustrated below

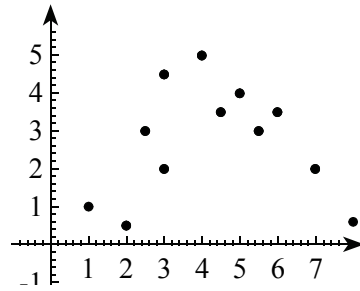
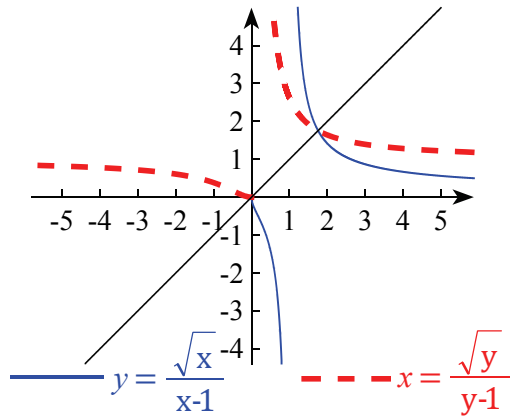




- Creating of plane and solid geometries objects as illustrated below:



- Graphical representation in two and three coordinates system as illustrated below:

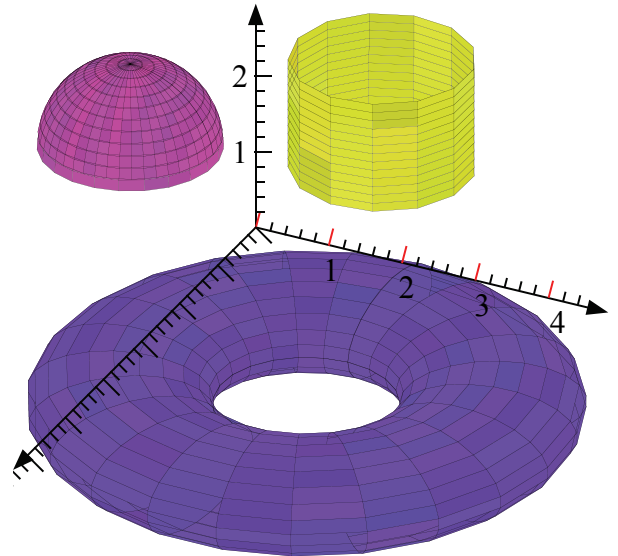


It is even possible to sketch many surfaces in the same coordinates system .

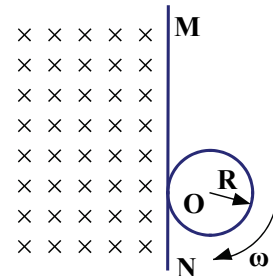
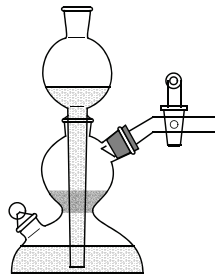
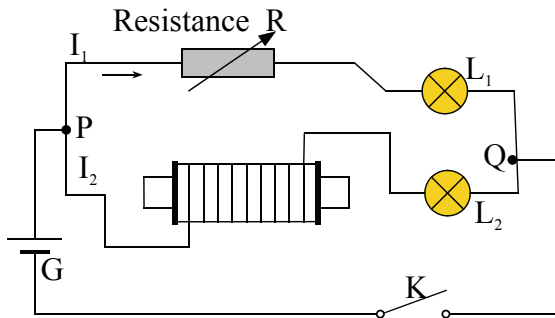
$$\begin{cases} x = \sin(u)\cos(v) - 1 \\ y = \cos(u)\cos(v) - 2 \\ z = \sin(v) \end{cases} \quad -3.14 \leq u \leq 3.14 ; 0 \leq v \leq 3$$

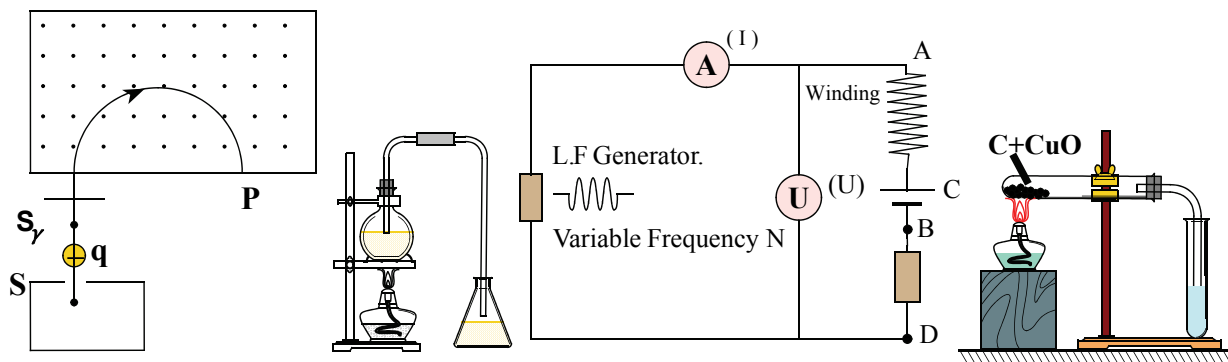
$$\begin{cases} x = \sin(u) + 3 \\ y = \cos(u) + 3 \\ z = v + 3 \end{cases} \quad -3.14 \leq u \leq 3.14 ; 0 \leq v \leq 1.5$$

$$\begin{cases} x = (3 + \cos(v))\cos(u) \\ y = (3 + \cos(v))\sin(u) + 0.6 \\ z = 0.5\sin(v) - 2 \end{cases} \quad -3.14 \leq u, v \leq 3.14 ;$$

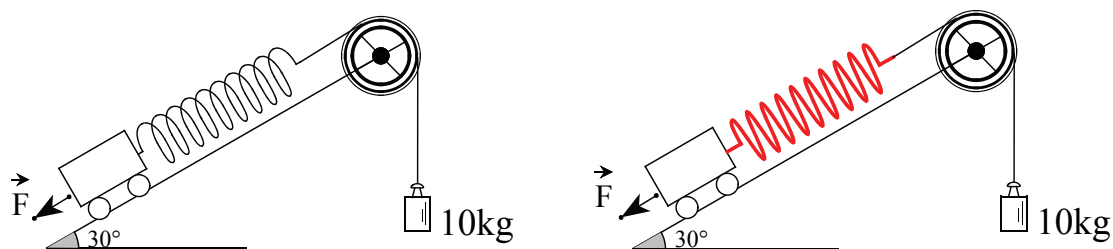


- Completing physics and chemistry experimental tools





In addition, it is quite easy to make some modifications quickly through ScienceWord and PagePlayer documents thanks to the availability of highly flexible tools. For example, to change the spring in Fig1 into that in Fig2, one simply needs to select options from the properties dialog box of the spring..



V- ScienceWord and PagePlayer are powerful tools for teaching and learning

The ability to animate objects, explore further and to probe deeper in order to find solutions to scientific questions using ScienceWord and PagePlayer has widened considerably the field of their applications, making them two powerful tools for teaching and learning at all educational levels.

In fact, ScienceWord and PagePlayer are logistics for the teaching and learning of ICT as a subject and for integrating in the teaching and learning process of subjects such as Mathematics, Physics, Chemistry, Design, Geography, Biology and many more in the school curriculum.

The study of ScienceWord and PagePlayer will then help to encourage learner-centred learning, active exploratory inquiry-based learning, collaborative work among learners and teachers, creativity, analytical skills and critical thinking. The efficiency of ScienceWord and PagePlayer will become a real motivation for lecturers, teachers, students and executives to use them on a daily basis in teaching and learning activities.

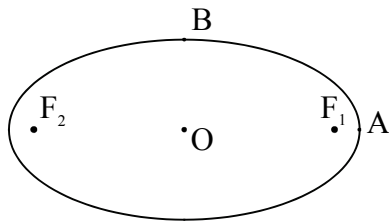
V-1- Teaching and learning technical drawing

Completing design on a computer offers a whole new dimension compared to drawing the traditional way with pencil, paper, ruler, and compass. One can draw and manipulate plane and solid figures, from the simplest to the most complex. Free manipulation of figures at any stage to test the construction, making conjectures, measuring or removing objects, calculating and making changes have all become very easy thanks to ScienceWord and PagePlayer. ScienceWord and PagePlayer are cutting-edge drawing tools designed for teachers as well as for students at all levels, from elementary school to university.

V-2- Teaching and learning mathematics

Geometrical constructions

Construction of geometric figures based on their definitions: triangles, medians, altitude bisectors, regular polygon, conics, tangent to a circle or an ellipse, inscribed circle and circumscribed circle of a triangle, positive and negative angle, etc have all become easy to do. Applying geometric transformations including symmetry, vector translation, projection, rotation, homothetic, .etc. are all possible. Notion of parallelism, perpendicularity, evenly divide, line extension, ratio, .etc. have all been taken care of.



The focal points F_1 and F_2 relocate themselves when the form of the ellipse or the direction of the axes change.

Show object

Perform measurements on geometric objects

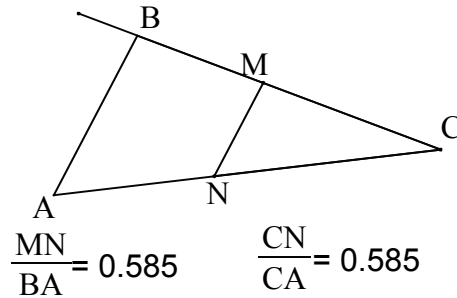
Length, distance, perimeter, angle, area, measures units (mm, cm, inch, degree, rd, π rd , mm^2 , cm^2 , inch^2).

Coordinates system

Define a point coordinates, draw straight line; plot graph of trigonometric functions conics, exponential and logarithmic functions, common function graph in coordinates system; Polar curve; parametric function; multi parameters function; create broken line with given data,etc Display points coordinates, slopes of lines, equation of lines, circle and ellipse, etc

Proof

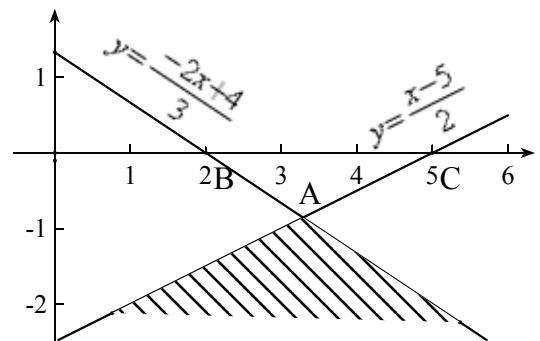
Polygon Congruence, tangents to a circle or an ellipse, Pythagoras, Thales theorems and others, functions limits, ..., mean and standard deviation of normal distribution density function .etc, cylinder area, etc.



Animate MN segment

Solving problems

Solving systems of equations and many other arithmetic and algebraic problems, limits problems and other analysis problems, trajectory of a point M and many other geometry problems, ..., etc.



$GCD(24,36) = 2^2 \times 3$ and $LCM(24,36) = 2^3 \times 3^2$ (see calculus1).

$1111011 = 3 \times 11 \times 131 \times 267$ (see calculus 2);

| | | | | | |
|---|---|---|---|---|---|
| 2 | 2 | 4 | , | 3 | 6 |
| 2 | 1 | 2 | , | 1 | 8 |
| 3 | 6 | , | | 9 | |
| | 2 | , | | 3 | |

Calculus 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 3 | 7 | 0 | 3 | 3 | 7 |
| 1 | 3 | 1 | 3 | 3 | 6 | 6 | 7 |
| | | | 2 | 5 | 7 | | |

Calculus 2

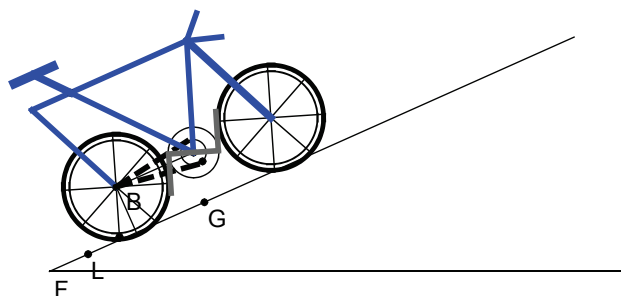
$$\text{Floor} \left(\left(\frac{2}{\sqrt{3}} \right)^2 - \sqrt{5} \times \frac{2}{\sqrt{3}} + \frac{3}{13} \right) = \text{floor} \left((2/\text{sqrt}(3))^2 - \text{sqrt}(5) * 2/\text{sqrt}(3) + 3/13 \right) = -2$$

Second function of Bessel degree 3:

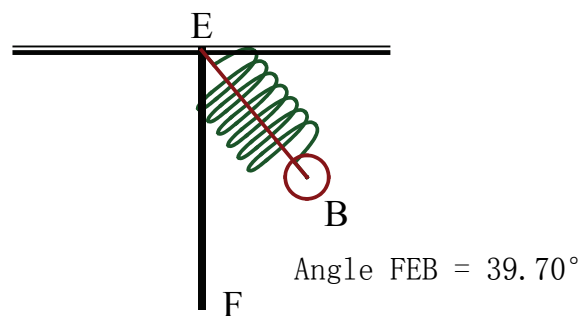
$$: Y \left(3, \left(\frac{2}{\sqrt{3}} \right)^2 - \sqrt{5} \times \frac{2}{\sqrt{3}} + \frac{77}{13} \right) = \text{yn} \left(3, (2/\text{sqrt}(3))^2 - \text{sqrt}(5) * 2/\text{sqrt}(3) + 77/13 \right) = 0.04814$$

V-3- Teaching and learning physics

You can apply mathematical principles to design a clock and set a real time, a bicycle or a car in motion, animate a spring, pumping, forces, solar system, motion under gravitation, hodograph motion, ..etc.



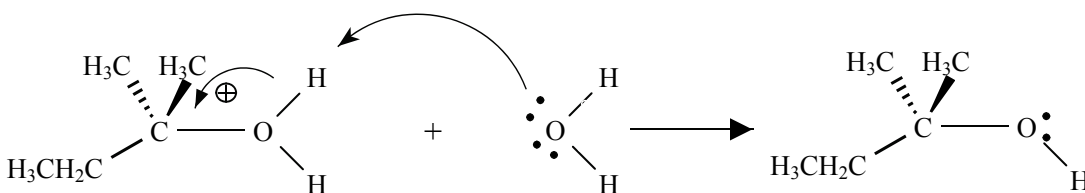
Animate Bicycle



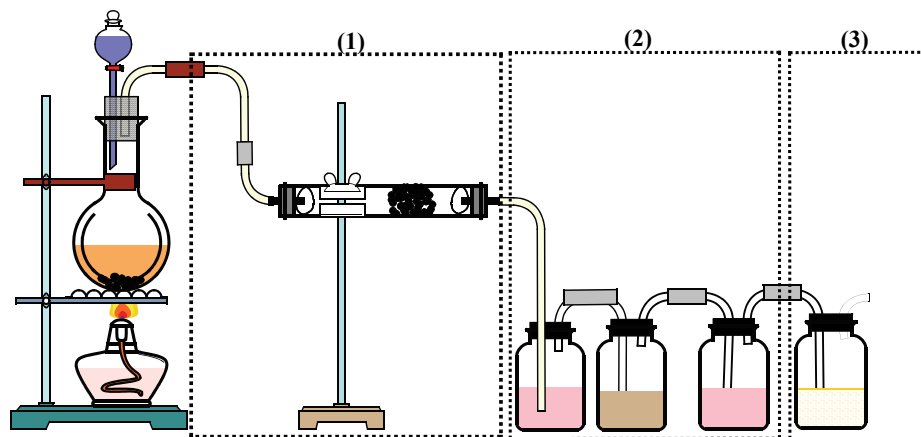
Spring rotation

V-4- Teaching and learning chemistry

You can make use of large range of available macromolecules templates to sketch the following complex chemical equation.



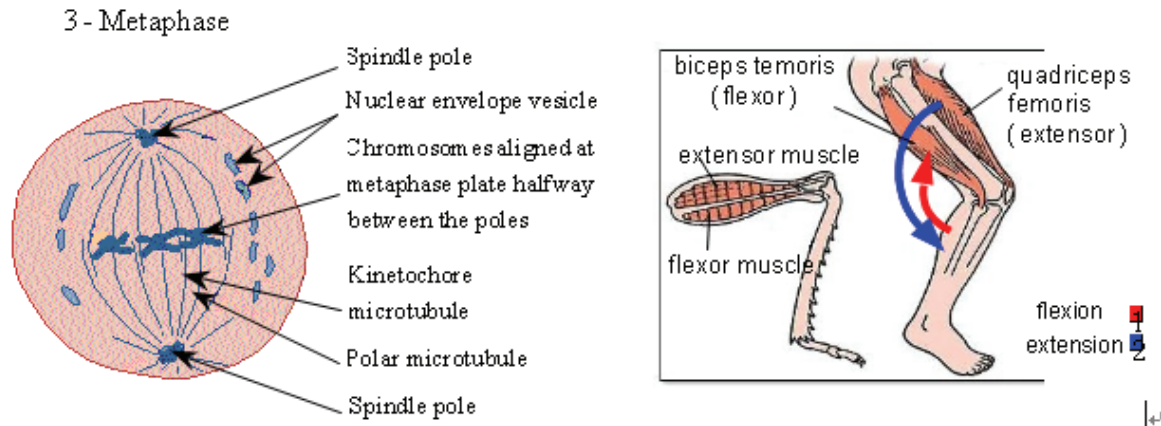
You can make use of available chemistry apparatuses to sketch the following experience



or the following electron distribution $(\text{Fe}) \begin{matrix} 2 & 8 & 14 & 2 \\ / & / & / & / \end{matrix} \dots \text{etc.}$

V-5- Teaching and learning biology and other subjects

You can make use of available graph library to insert biology diagrams, geography figures, etc.



VI - Symtome software

Symtome is a very revolutionary distance instant exchange tool based on ScienceWord technology, Instant Message technology, Instant Communication technology, Language and Sound treatment technology. Video technology eliminating the barrier of time and space and making it possible Instant Learning and Teaching over Internet explorer.

Chatting includes text, formulae, graph. The contents can be divided into paragraphs as in a regular word processor document.

When using the white board, Symtome enables the transmission simultaneously of the text being written and the lectures speeches being giving! Symtome even uses PagePlayer as auxiliary tool and enables Distance Public Presentation over Internet Explorer !!!

Symtome makes it possible to reproduce the traditional lectures in classroom over Internet with the following additional advantages:

- The possibility to record all the lectures and steps.
- Listeners can at any time attend a class and exchange ideas with lecturers.
- All the formulae, symbols, graphics are displayed in the regular manner. This facilitates an understanding, legibility and notes taking for the listeners.

Note: Symtome combines perfectly as it is done in ScienceWord, text, formulae, graphics in one document and it has the following meaning:

- ✓ The small memory bits conform to the character and requirements of online transmission, which is fast as possible; It makes it possible to exchange and transmit the large-sized scientific and technical documents over the Internet.
- ✓ The interlinks are reduced and the digitized browse and transmission of online resources become necessary and feasible.

VII - Target

VII -1- In Education

Various schemes for the acquisition of ScienceWord and PagePlayer and training for their use can be initiated in collaboration with educational institutions with the following goals:

- Primary Teachers for their educational reports, typing of test questions teaching and learning mathematic, physics, design, etc.
- Schools secretaries for the typing of test questions.
- Colleges and High Schools Teachers for the preparation of their lesson notes (typing of teaching material, typing and evaluation of test) , teaching and learning mathematic, physics, design, etc ..
- University lecturers for typing presentation of their lectures notes, setting exam questions.
- Computer rooms and libraries to facilitate access of ScienceWord and PagePlayer to the teachers and students for typing scientific documents and exploring solutions to scientific questions.

VIII -2- In professional and technical sectors

ScienceWord can be used to type scientific reports, technical and industrial design works; etc. PagePlayers can be used for projects presentation, articles advert or creating video supports from any application, Internet, etc..

The professional and technical sectors comprise: Telecommunications, Energy and water, Topography, Industrial Research, Design company, ..., etc.