Atoms, Bonding and Structure

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System Requirements
The program should work with any computer running Windows 3.1/95/98. A mouse is also required. Sound effects will be generated whether or not you have a soundcard.

Installation
Simply run the installation program "setup.exe" and follow on-screen instructions.

When you first run the program, an options screen will pop up. The options program can be run later by running 'Change Options' from the program manager or the programs menu.

Uninstall

Simply click on the uninstall icon to remove 'Atoms, Bonding and Structure' from your system.

Running The Program

Win 3.1: Run the program by clicking on the 'Bonding' icon in the Atoms, Bonding & Structure group which will be on your desktop.

Win95/98: From the start menu, select programs and then the Atoms, Bonding & Structure folder. Then select the 'Bonding' icon to run the program.

Features of the Program.

The program contains eight teaching units plus a reference section. Each unit consists of a number of sequential ***pages*** and they all teach and test pupils as they learn; sounds are used to indicate correct and wrong answers (using the speaker if you don't have a soundcard) - so if you have speakers, please switch them on. As far as possible, skills are taught through familiar examples to help reinforce general chemical knowledge, and with frequent reference to the online Periodic Tables.

The notebook symbol suggest notes which pupils could make as they use the program, for later reference. Personally, I always insist that these notes are made - it prevents pupils from rushing through a unit.

Click the information, ***i***, symbol for hints, extra explanation or background information. This data is automatically copied to the clipboard and can be pasted into any word processor. The same applies to clicking the notebook symbol.

The program includes TWO interactive Periodic Tables, one for use with younger pupils (UK Key Stage 3) and one more suitable for older pupils (UK Key Stage 4). The later units(3 - 8) have a '<***back'*** button at the top left of most pages which allows reference back to the previous page.

There is also an option to 'trap' the user within a unit once started (to help teachers ensure that pupils stay on task), with a code required to exit. Details at the end of this manual.

Points Score/Certificate
The program automatically adds up totals of correct and wrong answers for each unit as you go along. This score can be displayed by clicking the RIGHT mouse button on the bottom right of most screens.

The score will be shown on a certificate which is displayed at the end of each unit and which can be printed out on most systems. Note that if the date or time on the certificate appear incorrect, you should adjust your computer settings via the date/time section of the control panel.

Using the Program

The early units are intended for use at Key Stage 3 and the rest at Key Stage 4 (UK). Ideally, the program would be used with a whole class, each pupil with their own computer (a site licence would be required). However, it could be also used for individual work, extension, or demonstration (ideally with a large monitor or projector).

The units should be seen as *resources* that form part of a teaching scheme. For the most able, they might be used as an introduction; for the less able they could be used after introductory work or as reinforcement They can also be used as for quick revision of a topic. The program will also be useful in helping non specialists teach some of the more abstract aspects of Chemistry.

It is definitely NOT intended that the program be worked through from beginning to end. Rather, it should be used one unit at a time over a number of years, as pupils build their skills.

A typical unit might require about a lesson (30-40 minutes) to complete, if the suggested notes are made.

Reference Section

In addition to the teaching units, the contents page of the program contains a reference section which can be accessed at any time. It has the following sections:

Simple Periodic Table - a simple, interactive Periodic Table
Periodic Table - an interactive Periodic Table
Atom Builder - build up the structures of any of the first 20 atoms (up to calcium) on screen.
Ionic Bonding - an interactive simulation enabling pupils to view, on screen, the bonding in dozens of ionic compounds.
Covalent Bonding - an interactive simulation enabling pupils to view, on screen, the bonding in 12 simple covalent compounds.
Bond Energy Calculator - A specially designed calculator with common bond energise built in. It makes bond energy calculations much easier.

Unit 1 - Elements, Compounds and Mixtures

Learn the difference between elements, compounds and mixtures in terms of particles. A variety of common examples are studied.

Unit 2 - Forming Compounds

Learn about the formation of common compounds and mixtures and the difference between physical and chemical change. Common methods of separating mixtures are also considered briefly.

Unit 3 - Atomic Structure

Learn about the structure of atoms in terms of the various particles involved and their arrangement in atoms. The 'Atom Builder' section (also available as reference) allows pupils to 'build' any of the first 20 atoms (up to calcium) on screen.

Unit 4 - Chemical Bonds

Learn what is meant by Chemical Bonding, the difference between ionic and covalent bonding plus an introduction to metallic bonding.

Unit 5 - Ionic Bonding

Learn how ionic compounds are formed from atoms by gain and loss of electrons. View the bonding of dozens of ionic compounds interactively on screen, via a simple simulation which allows you to build individual atoms of your choice and shows the electron transfer that occurs when the compound forms.

Unit 6 - Covalent Bonding

Learn how covalent compounds are formed by atoms sharing electrons. Build up and view the electronic structure of any of twelve common covalent compounds on screen via a simple simulation.

Unit 7 - Structure of Materials

Teaches about giant and molecular structures and their properties. The structures of sodium chloride and water are studied as examples. The various allotropes of carbon are also compared, including a look at the fullerenes.

Unit 8 - Bond Energies

An introduction to the energy changes that accompany chemical reactions, with a number of guided calculations. A simple 'Bond Energy Calculator' is used to make the calculations easier. Energy profiles of chemical reactions and Activation Energy are also studied.

Use of Clipboard

Whenever you click on the 'information' or 'notes' symbols, or on an element in the Simple Periodic Table, the text is automatically sent to the clipboard and can be pasted into other programs (eg Notepad, Wordpad, Word).

Change Options

Sound Effects

These can be switched off from within the main program - but this setting is not saved as the program is designed for use with sound.

The following options can be changed by clicking on 'Change Options' icon in the 'Atoms, Bonding and Structure' group or folder.

Trapping Users

The program can work in 2 modes: one offers a menu on each page so that users can enter and leave program units at will; the other 'traps' the user within a unit once started (to help teachers ensure that pupils stay on task). For ease of evaluation the default setting is for a menu on each 'page'.

Quick Exit

When in the mode that traps the user, you may wish to terminate the program rapidly (perhaps at the end of a lesson). Do this by typing a password into any answer box and clicking the page heading (on pages without answer boxes RIGHT click the page heading and enter the password - this works at all times for the quiz pages.). The default password is ***bonding,*** but this can easily be changed (see below). The password is not secure and can be changed at any time. You can revert to the default password by deleting the file "bondpass.opt" from the "bonding" directory.

Answers

There is an option to give answers to most questions after 3 consecutive wrong attempts . Home users, or those using the program for self study, will probably benefit from being given the answer. Teachers may want to force students to work out answers for themselves! In the unregistered program, the option to provide answers only works for Units 1 and 2

Print Certificate

A printable certificate is displayed at the end of each unit. If you don't want students to print certificates, then there is an option to hide the 'Print certificate' button.

Also, some systems/printers seem only to print blank pages. Again, opt to hide the print button.

Spelling Preference

'Change Options' also allows you to choose between US and UK spellings.

On a network the 'Change Options' and uninstall programs should not be available to pupils.

This may seem complicated, but might help teachers keep one step ahead of pupils!

Please ensure that all teachers have a copy of this page! And let them know if you change the password.

Warranty Disclaimer

These programs and documentation are provided "as is" and without

any express or implied warranties. I have run the programs on a number of machines but cannot possibly anticipate all possible variations of software and hardware that the programs may be run under. Therefore, the user must assume the entire risk of using these programs. Under no circumstances will I be liable for any damages arising from the use of, or inability to use, these programs.

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