Periodic Table for the TI-83 Plus

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Where to Find Installation Instructions

You can find detailed instructions on installing Flash applications at education.ti.com/guides.

What is the Periodic Table Application?

This application lets you:

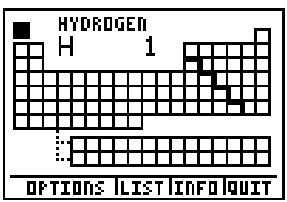
- Observe and explore the Periodic Table of the Elements on the TI-83 Plus calculator.
- Find property data and useful information about the 109 known elements.
- Sort the elements by atomic number, alphabetically by name, or alphabetically by symbol.
- Identify groups of elements by region (noble gasses, halogens, etc.) and block (p-, d-, s- and f-).
- Export property data to lists for further analysis.
- Graph the major properties (atomic radii, electronegativities, etc.) against atomic number to illustrate the periodic nature of the elements. Getting Started: Exploring the Element Titanium

Getting Started: Exploring the Element Titanium

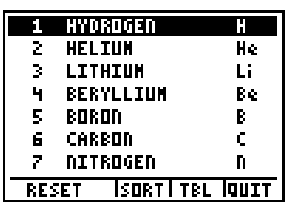
Sort the element list by name to find Titanium's atomic number. Display its property details, and find its region.

1. Press APPS. If you do not see Periodic as an option, you need to download the Periodic Table application to your TI-83 Plus.

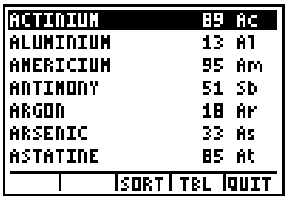
2. Select **Periodic**. The Periodic Table displays.



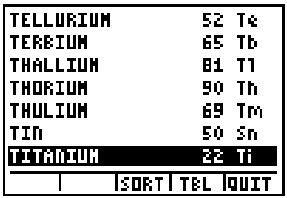
3. Select **LIST** to display the elements in list form sorted by atomic number.



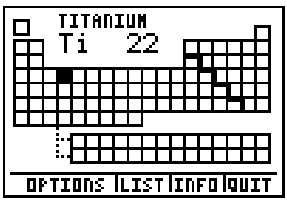
4. Select **SORT**. Press ▼ and select **OK** to select **NAME**. This displays the list sorted alphabetically by element name. (This takes a few seconds.)



5. Press ALPHA T (4). This scrolls to and highlights the first element beginning with T, Tantalum. Press ▼ until you highlight **TITANIUM**.

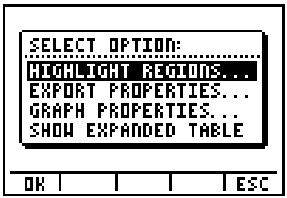


6. Select **TBL** to return to the Periodic Table. The cursor is highlighting **TITANIUM**.

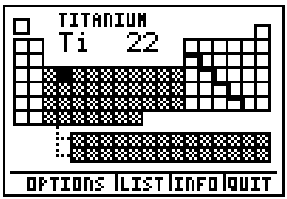


7. Press ENTER to display the element property details for Titanium. Use ▼ and ▲ to scroll between the properties.

8. Select **TBL** to return to the Periodic Table. Select **OPTIONS** to display the **SELECT OPTION** menu. Select **HIGHLIGHT REGIONS**.



9. Select a region and select **OK**. The calculator automatically highlights the corresponding region.



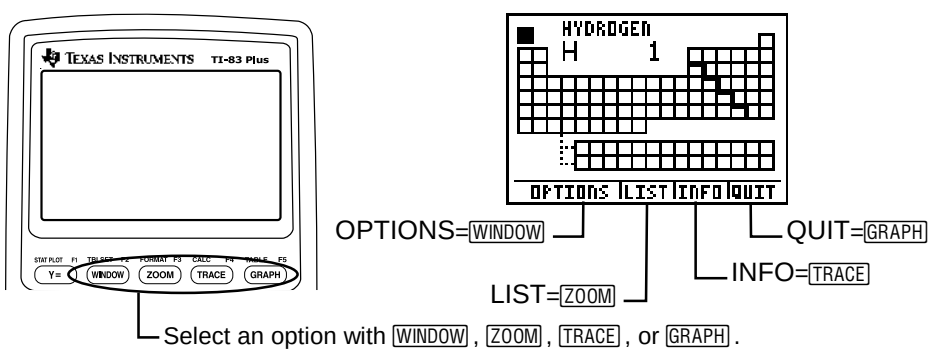
General Information

The Periodic Table application uses two types of screens: display screens and menu screens.

Display Screens

On a display screen, the calculator displays information about the elements. Each display screen has up to 4 options located in a row along the bottom of the screen. Press the TI-83 Plus graphing keys to select the corresponding option: WINDOW selects option 1; ZOOM selects option 2; TRACE selects option 3; GRAPH selects option 4.

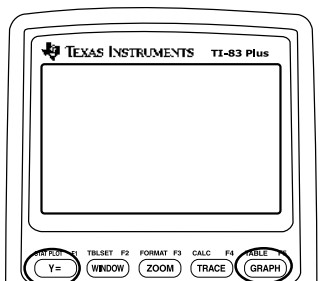
Display Screen | **The Periodic Table**



Menu Screens

Menu screens provide you with a choice of menu items. To select an item, press ▲ or ▼ to highlight it and then select **OK** (Y=) or press ENTER. To exit a menu without making a selection and to return to the previous screen, select **ESC** (GRAPH)

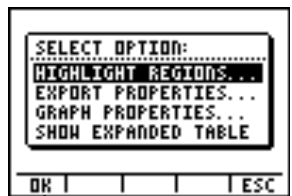
Menu Screen



Select the menu item with Y=.

Exit the menu with GRAPH.

The SELECT OPTION Menu



OK=Y=

ESC=GRAPH

Property Value Sources

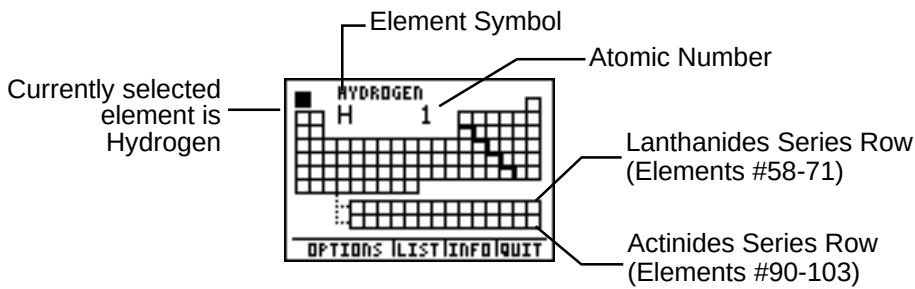
The property values of the elements contained in this application are based on one of two sources: *The CRC Handbook of Chemistry and Physics, 79th ed.* (weight, boiling point, melting point, discovery date), and *Lange's Handbook of Chemistry, 15th ed.* (radius, 1st ionization potential, electronegativity, density, configuration). See the section entitled "Works Cited" for detailed bibliographic information.

Every effort has been made to ensure accuracy. However, if you do find an error or have a comment for a product improvement, please send an e-mail to ti-cares@ti.com.

Periodic Table

The first screen you see displayed is the Periodic Table, which displays all 109 elements. The Lanthanides and Actinides Series (Inner-Transition) rows are displayed below the main table.

Information (name, symbol, and atomic number) about the currently selected element is shown at the top of the screen.



To select different elements, press ◄, ►, ▲, and ▼. The TI-83 Plus automatically moves the cursor to the Lanthanides Series after element 57 and returns to the main table after element 71. Also, the cursor moves to the Actinides series after element 89 and returns to the main table after element 103.

Element Detail Screen

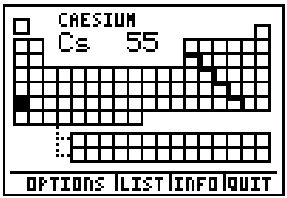
While on the Periodic Table, you can highlight an element, and then press [ENTER] to display the following element details: **ATOMIC #**, **SYMBOL**, **WEIGHT**, **NEUTRONS**, **PROTONS**, electron configuration (core method), **RADIUS**, **1ST ION** (1st ionization potential), **ELECTRONEG** (electronegativity), **DENSITY**, **MELTING PT**, **BOILING PT**, **STATE** (normal state), **OX STATE** (oxidation states), and **DISCOVERED** (date of discovery).

Options available on this screen include:

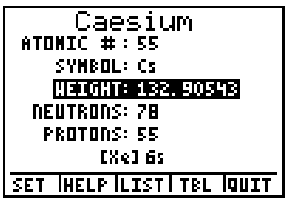
SET	While highlighting any numerical value on this menu, select **SET** to send the value to your calculator's home screen. When you press [2nd] [QUIT] to exit the application, the highlighted value is displayed on the calculator's home screen for use in further calculations.
HELP	Displays information to help you interpret the property details, such as units of measurement and definitions. Select **NEXT** for more information or ESC to return to the Element Details Screen.
LIST	Displays a **LIST** of the Periodic Table elements (described under the section entitled, "**LIST** Screen").
TBL	Returns to the Periodic Table.
QUIT	Exits the Periodic Table application.

Example: Use the **SET** option to find the weight of 5 moles of Caesium.

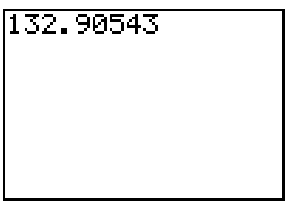
1. From the Periodic Table, use ◄, ▲, ►, ▼ to highlight **CAESIUM** (Atomic Number=55).



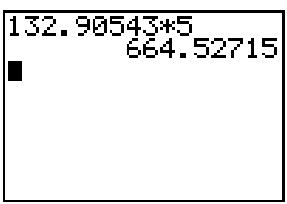
2. Press ENTER to the display the CAESIUM Detail Screen.
3. Press ▼ ▼ to highlight **WEIGHT**.
4. Select **SET**.



5. Select **QUIT** to exit the application and return to the TI-83 Plus Home screen, where the height is automatically displayed.

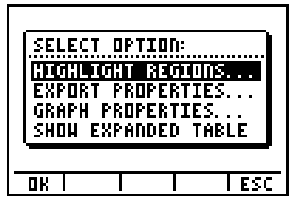


6. Press × 5 ENTER to multiply the weight by 5.
7. To resume the application, press APPS, and then select **Periodic**.



Periodic Table Options Menu

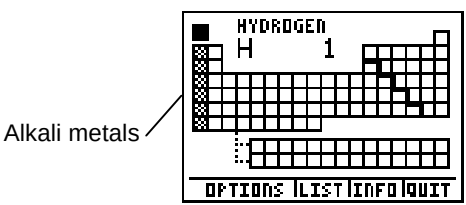
From the Periodic Table, select **OPTIONS**. The SELECT OPTION menu displays.



Highlight Regions

When you select a region from the HIGHLIGHT REGIONS menu, the TI-83 Plus displays the Periodic Table with only the selected region highlighted. You can display only one region at a time. Selecting **ALL** (default) will remove all highlighting.

The regions are: ALL, ALKALI METALS, ALKALINE METALS, TRANSITION ELEMENTS, INNER-TRANSITION, HALOGENS, NOBLE GASES, METALLOIDS, NON-METALS, ACTINIDE SERIES, LANTHANIDE SERIES, and METALS.



Export Properties

EXPORT PROPERTIES creates two lists, each with 109 items. The first list, ʟNUM, contains 1-109, representing the atomic number for every element. The second list is a corresponding property list, ʟ*property*. For example, if you select **DENSITY**, then the list ʟDEN contains 109 density values, one for every element.

PROPERTY	Property List Name
ATOMIC RADIUS	ʟRAD
1ST IONIZATION ENERGY	ʟION
ELECTRONEGATIVITY	ʟENEG
DENSITY	ʟDEN
MELTING POINT	ʟMP

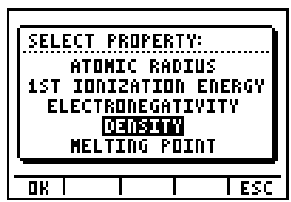
If the property value is unknown for a certain element, the value exported is -1 (false). If there is not enough memory to store the list, then the **NOT ENOUGH MEMORY TO SAVE PROPERTIES** error message displays. You must use [2nd] [MEM] **2: Mem Mgmt/Del 4:List** to delete lists to create the needed free space.

The lists are stored in the calculator's memory and their names are listed on the 2nd [LIST] NAMES menu. Therefore, you can use those lists with other TI-83 Plus features even if you are not running the application.

Example: Export all 109 atomic numbers and densities to lists.

1. From the Periodic Table, select **OPTIONS**, and then press ▼ to highlight **EXPORT PROPERTIES**.

2. Select **OK** and press ▼ ▼ ▼ to highlight **DENSITY**.

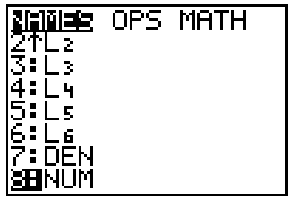


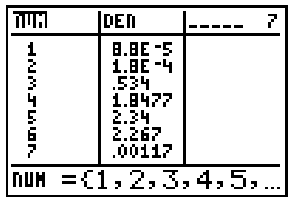
3. Select **OK** to export the data to lists. Press any key to return to the SELECT OPTION menu.

4. Press [2nd] [QUIT] to exit the application. Press [2nd] [LIST] to view all the list names. Scroll down to see **DEN** and **NUM**.

   You can now manipulate the list data using related TI-83 Plus features. To view numerical values, insert the lists into the List Editor.

   See Chapter 11 in the TI-83 Plus Guidebook (education.ti.com/guides) for more information.





5. To resume the application, press [APPS], and then select **Periodic**.

Graph Properties

GRAPH PROPERTIES let you select the property values included in a Y list. The calculator graphs the Y-list versus the constant X list labeled ATOMIC NUMBER. The Y-list property options are: atomic radius, 1st ionization energy, electronegativity, density, or melting point. After selecting a Y-list value, the TI-83 Plus automatically displays the graph.

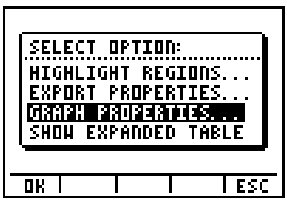
Options available on this screen include:

← (or ◧)	Moves the trace cursor to the next element.
Symbol	Displays the Details Screen for the highlighted element (whose atomic number represents the X-value).
→ (or ◨)	Moves the trace cursor to the previous element.
TBL	Returns to the Periodic Table.
ESC	Returns to the GRAPH PROPERTIES menu.

Example: Graph atomic number (X) versus electronegativity (Y).

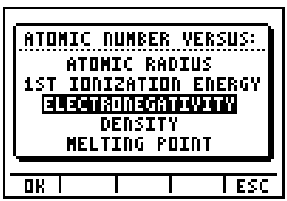
1. From the Periodic Table, select **OPTIONS**.

2. From the SELECT OPTION menu, press ▼ ▼ to highlight **GRAPH PROPERTIES**.



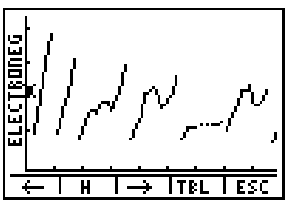
3. Select **OK** to display the ATOMIC NUMBER VERSUS: screen.

4. Press ▼ ▼ to highlight **ELECTRONEGATIVITY**.



5. Select **OK** to display the graph.

6. Select ← or → to trace the graph.



Show Expanded Table

SHOW EXPANDED TABLE shows the s-, d-, p-, f- blocks. When you select a block, the name displays at the top of the screen.

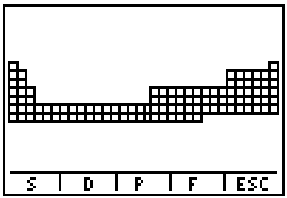
Options available on this screen include:

S	Highlights the s-block.
D	Highlights the d-block.
P	Highlights the p-block.
F	Highlights the f-block.
ESC	Returns to the Periodic Table.

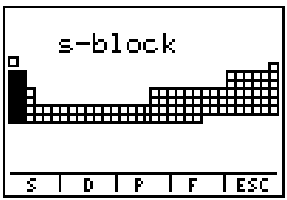
Example: Displaying the s-block

1. From the Periodic Table, select **OPTIONS**.
2. From the SELECT OPTION menu, press ▼ ▼ ▼ to highlight **SHOW EXPANDED TABLE**.

3. Select **OK** to display the expanded table.



4. Select **S** to display the highlighted s-block.



LIST Screen

The **LIST** screen displays all elements in list form, sorted according to the currently selected **SORT** option. You can sort the list by atomic number (default), alphabetical by name, or alphabetical by symbol. When the list is sorted by NAME or symbol, you can jump to the first element beginning with a particular letter by pressing [ALPHA] and then the letter from the keyboard.

When the list is sorted by atomic number, you can jump to an element by pressing the number keys; selecting **RESET** returns to the first element; you can then jump to another element number.

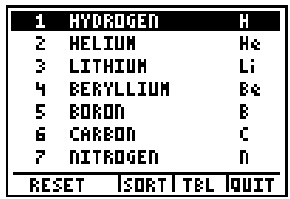
To display the LIST screen, select **LIST** from the Periodic Table. Options available on this screen include:

RESET	Resorts list according to default (ATOMIC NUMBER).
SORT	Lets you select the type of sort: by ATOMIC NUMBER, NAME, or SYMBOL.
TBL	Returns to the Periodic Table.
QUIT	Quits the Periodic Table application.

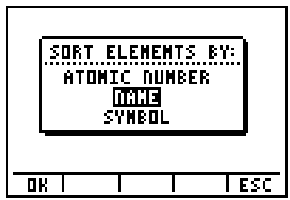
Example: Sorting elements alphabetically by name

1. From the Periodic Table, select **LIST**.

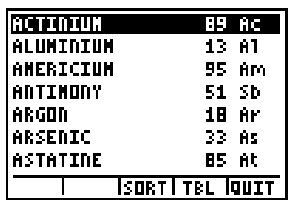
2. From the List screen, select **SORT**.



3. Press ▼ to highlight **NAME**.



4. Select **OK**. (This takes a few seconds.)

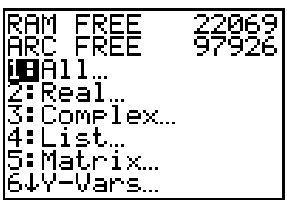


Deleting Periodic Table from the TI-83 Plus

You may have more than one Flash application on the TI-83 Plus at one time. When you need more space, you may remove an application and download it again later from a PC.

To remove the Periodic Table application from the calculator, follow the procedure for deleting any application from archive memory:

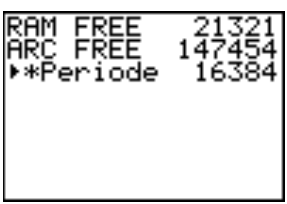
1. Press [2nd] [MEM] **2:Mem Mgmt/Del**... to display the amount of **RAM** and **ARC** space available.



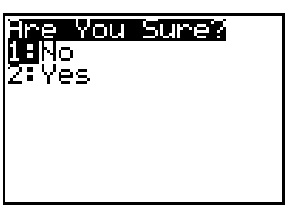
2. Select **A:Apps**.

3. Move the ▸ indicator to ∗**Periodic**.

4. Press [DEL].



5. Select **2:Yes** when asked **Are You Sure?**



Error Recovery Instructions

Low Battery Condition

Do not attempt a Flash download if the low-battery message appears on the calculator. Low battery indication is shown on the initial screen. If you receive this error during an installation, change the batteries before trying again.

Check Amount of Flash Application Free Space

On the TI-83 Plus, press 2nd [MEM], and then select **2:Mem Mgmt/Del...** . Each application requires at least 16,535 bytes of **ARC FREE**.

Archive Full

This error appears when the TI-83 Plus does not have sufficient memory for the application. In order to make room for another application, you must delete an application and/or archived variables from the TI-83 Plus. Before deleting an application from the TI-83 Plus, you can back it up by using the **Link > Receive Flash Software...** menu in TI-GRAPH LINK for the TI-83 Plus. Once saved, you can reload it to the TI-83 Plus later using the **Link > Send Flash Software** menu in TI-GRAPH LINK.

Communication Error

This error indicates the Flash Installer is unable to communicate with the TI-83 Plus. The problem is usually associated with the TI-GRAPH LINK cable and its connection to the TI-83 Plus and/or to the computer. Make sure the cable is firmly pushed into the calculator and the computer.

If this does not correct the problem, try a different TI-GRAPH LINK cable and reboot your computer. If you continue to get this error, please contact TI-CARES.

Validation Error

This calculator does not a certificate to run the application, or electrical interference caused a link to fail.

Miscellaneous Errors

See pages B–6 through B–10 in the TI-83 Plus manual (education.ti.com/guides) for information about the specific error or contact TI-CARES.

Miscellaneous

If you obtain new or upgraded software for your TI-83 Plus, you may need to provide your current software version and/or the serial number of your unit. It is also good to know your version number in case you have difficulties with your TI-83 Plus and need to contact technical support. Knowing the software version may make it easier to diagnose the problem.

Verify Maintenance Upgrade Version and Serial Number

1. Press 2nd [MEM].
2. Select **1:ABOUT**.

The version number has the format **x.yy**. The serial number appears on the line beneath the product ID number.

Verify the Version of the Periodic Table Application

1. On the TI-83 Plus, press APPS.
2. Select **Periodic** and select **INFO**.

The version number of the application is displayed.

Works Cited

Lide, David R., ed. *CRC Handbook of Chemistry and Physics A Ready-Reference Book of Chemical and Physical Data*, 79th ed. (Boston: CRC Press LLC, 1998).

Dean, John A., *Lange's Handbook of Chemistry*, 15th ed. (St. Louis: McGraw-Hill, Inc., 1999).

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E-mail: ti-cares@ti.com

Phone: 1-800-TI-CARES (1-800-842-2737)
For US, Canada, Mexico, Puerto Rico, and Virgin Islands only

Home page: education.ti.com

For technical questions

Phone: 1-972-917-8324

For product (hardware) service

Customers in the US, Canada, Mexico, Puerto Rico, and Virgin Islands: Always contact TI Customer Support before returning a product for service.

All other customers: Refer to the leaflet enclosed with your product (hardware) or contact your local TI retailer/distributor.

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Page Reference

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