

Science: Chemistry

Sample Lesson Plan: Introduction to the Periodic Table of Elements

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Content Objectives: To learn what an element is and the factors by which they are arranged on the Periodic Table.

Class opener/Do Now: Students will have 90 seconds to write down as many “elements” as they can think of. Then, as a class, students will share their lists, and a list of elements will be formulated on the board.

Mini-lesson: Begin with visual aides; explain how elements make up objects in every day life; exist in different phases (solid [Au and Ag jewelry], liquid [Hg in thermometer], gas [He in balloon]).

Introduce the Periodic Table:

- What is an element?
 - The simplest form of matter; cannot be decomposed into simpler substances; matter
 - composed of one kind of atom, each atom has same properties; atoms all have the same atomic number
- Break down into name and atomic symbol
 - Ex: Carbon
 - Review subatomic particles from previous unit (electrons, protons, neutrons)
 - Atomic number (Z): number of protons in atomic nucleus

 computational... knowledge engine

atomic number ☰

Assuming "atomic number" is referring to elements | Use as a **word** instead

Input interpretation: Mathematica form

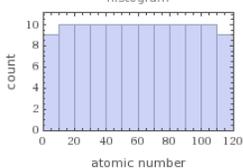
elements atomic number

Summary:

median	$\frac{119}{2}$
lowest	1 (hydrogen)
highest	118 (ununoctium)

Distribution plots:

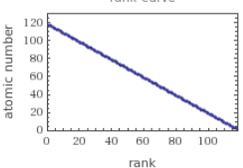
histogram



count

atomic number

rank curve



atomic number

rank

Atomic number rankings: More | Reverse

1	ununoctium	118
2	ununseptium	117
3	ununhexium	116
4	ununpentium	115

- Atomic weight: average atomic mass for naturally occurring element (amu's)

 computational... knowledge engine

atomic weight ☰

Assuming "atomic weight" is a word | Use as referring to elements instead

Input interpretation: Mathematica form

atomic weight (English phrase)

Definition:

Noun:

atomic weight	(chemistry) the mass of an atom of a chemical element expressed in atomic mass units
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Synonyms:

Noun:

atomic weight	atomic mass relative atomic mass
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- Atomic mass units (amu): mass unit equal to exactly 1/12 mass of carbon-12 atom

Examples in W|A:

carbon



Assuming "carbon" is a chemical element | Use as a chemical compound or a word or a city instead

Input interpretation:

Mathematica form

carbon (chemical element)

Periodic table location:



The periodic table shows Carbon (C) in the second period, group 14. The element is highlighted in orange in the original image.

Basic elemental properties:

[Less](#)

abbreviation	C
atomic number	6
electron configuration	[He]2s ² 2p ²
block	p
group	14
period	2
atomic weight	12.0107


 computational...
 knowledge engine

Rg

Assuming "Rg" is a chemical element | Use as a word instead

Input interpretation: Mathematica form
roentgenium (chemical element)

Periodic table location:



Basic elemental properties: More

abbreviation	Rg
atomic number	111
atomic weight	(272)
half-life	10 minutes

Atomic properties: More

quantum numbers	$2S_{1/2}$
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(electronic ground state properties)

- Organization of the PT (rows, columns, classification of element, mass, properties)
 - Row (period)
 - Column (group)

- **Student Exercise:** Students will be broken up into pairs to complete the worksheet of questions using Wolfram|Alpha that can be answered based on the lesson material. Worksheet will be handed in upon completion of the activity. (Worksheet is on the next page)

Ticket to Leave (5 min): Students have to complete a periodic table puzzle. They will be dismissed once they have raised their hands and asked for my approval.

Demonstrations:

- <http://demonstrations.wolfram.com/BuildThePeriodicTable/>
- <http://demonstrations.wolfram.com/PeriodicTableIn3D/>
- <http://demonstrations.wolfram.com/PropertiesOfTheElements/>

PICK AN ELEMENT, ANY ELEMENT

Name: _____

Choose an element on the periodic table and answer the questions that follow. Some research may be required to complete the assignment, so utilize any resources necessary (Wolfram|Alpha, textbook, etc).

- 1.) What is the name of the element?

- 2.) What is the atomic symbol of the element?

- 3.) What is the atomic number?

- 4.) What is the atomic weight (including units)?

- 5.) What period and what group is this element found?
 - a. Period:
 - b. Group:

- 6.) Name two facts/properties that you learned about this element?
 - a.
 - b.

- 7.) What is this element used for? Applications?

- 8.) Compare your 2 favorite elements. What did you learn?