

Name _____ per _____ date _____ mailbox _____

THE PERIODIC TABLE - note: *atomic weight* in the article is the same as *atomic mass* from class.

1. Everything that is naturally occurring on Earth is made up only of this number of elements?

2. The basic components of all elements, are made up of atoms. The three basic particles that make up all atoms are _____, _____ and _____.
3. When scientists first tried to describe the physical and chemical properties of the elements and chemical compounds, which are formed by the combination of atoms of different elements, they soon become buried under a bewildering array of complex combinations and seemingly unconnected facts. The need to organize all this information, data and facts arose. The solution was:
A. Filing systems C. Scientific collaboration
B. The Periodic Table D. Museums
4. How did Dmitry Mendeleev arrange elements on the Periodic Table?
A. Not until the 20th Century (1900-2000), were we able to accurately construct any of the Periodic Table.
B. Mendeleev was able to predict chemical properties of elements that had not even been discovered yet, by arranging elements based on known properties like atomic mass.
C. Mendeleev's contributions were over shadowed by Julius Meyer and forgotten to history.
D. Meyer and Mendeleevs' elemental arrangements were completely incorrect.

THE NUCLEAR ATOM

5. "Atom" is actually a Greek word meaning _____?
A. Divisible C. Divided
B. Indivisible D. United

6. **Matching (write # on line)**

- | | |
|----------------------|---|
| ___Thompson | 1- developed periodic tables in 1869 independently of one another |
| ___Mendeleev & Meyer | 2- discovers the electron in 1897 at Cambridge University, England |
| ___Mosely | 3- New Zealand physicist discovers nucleus and protons 1911 |
| ___Chadwick | 4- discovers the neutron , 1932 also at Cambridge University, England |
| ___Rutherford | 5- discovered that all elements have a different number of protons and distinct X-ray patterns, just prior to WW I which confirmed Mendeleev's work. |

7. Mosely was able to relate the properties of X-rays to the number of protons contained in an element. This came to be known, as the atomic number and is always reported as a whole number, not a decimal, like atomic weight (*mass*). He discovered that the number of protons was _____.
- A. just another part of the atom's nucleus
 - B. a type of x-ray
 - C. unique to the individual element and therefore a key identifier and collaborator of Mendeleev's Periodic Table
 - D. insignificant to element properties

Fill in the blank:

8. Atoms are normally _____ neutral, with an equal number of electrons and _____. This means for example, that carbon, with an atomic number of _____, has six protons in its nucleus and six electrons outside the nucleus.

ISOTOPES

Define:

Ex:

9. Mosely's findings demonstrated that it was _____ and not _____ that determined or distinguished one element from another.
- A. **atomic weight** and not **atomic mass**
 - B. neutrons and not electrons
 - C. isotopes and not atoms
 - D. **atomic number** and not **atomic mass**
10. What distinguishes one isotope from another such as in the three species of hydrogen; protium, deuterium and tritium is _____.
- A. Proton count
 - B. Electron count
 - C. Atom size
 - D. Neutron count

11. Why is it that the atomic weight (*mass*) is often not a whole number, but rather a decimal?
- A. Because it is actually an average of several or all of the naturally occurring isotopes of an element
 - B. Trick question, the atomic weight is always a whole number
 - C. Wait trick choice, isn't the atomic mass always an average
 - D. Huh?

THE MODERN PERIODIC TABLE

Fill in the blank:

12. The modern statement of *the periodic law* is that the _____ and _____ properties of the elements vary in a periodic way with their atomic numbers.

Word bank fill in the blank: properties, groups, periods, Mendeleev,
atomic number, periodic, electric forces

13. The modern periodic table is arranged very much like _____ table.
14. The elements are arranged in rows called _____.
15. In each period, the elements are arranged by order of _____.
16. The vertical columns of the periodic table are also called _____.
17. All the elements within a group have similar chemical _____.
18. The elements on the Periodic Table are arranged in this manner because they have repeating predictable _____ chemical and physical properties that they share.
19. Atoms are attracted to one another by _____.

20. What causes this periodic behavior of the elements? Why do the elements within a particular group have similar chemical behavior?

- Atoms are attracted to one another by electrical _____

- The number of protons ultimately determines how many

- Electrons in turn ultimately determine how atoms

- Thus, the chemical behavior of an element is

21. Quantum Theory "the gist" -

The duality -

22. Elements in the same group in the periodic table have the same number of electrons in their outer shells.

This causes them to have _____

A. the same valence electron configuration and thus similar chemical reactivity.

B. distinct proton formations

C. different properties

D. multiple atom arrangements

Name Key per _____ date _____ mailbox _____

THE PERIODIC TABLE

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- C. unique to the individual element and therefore a key identifier and collaborator of Mendeleev's Periodic Table
- D. insignificant to element properties

Fill in the blank:

8. Atoms are normally electrically neutral, with an equal number of electrons and protons. This means for example, that carbon, with an atomic number of 6, has six protons in its nucleus and six electrons outside the nucleus.

ISOTOPES

Define:

All the atoms of given element have the same number of protons, however they can have different #'s of neutrons.

Ex: deuterium - hydrogen w/ 1p + 1n = 2amu

tritium - H w/ 1p + 2n = 3amu

9. Mosely's findings demonstrated that it was atomic number and not atomic mass that determined or distinguished one element from another.

- ~~A. atomic weight and not atomic mass~~
- ~~B. neutrons and not electrons~~
- ~~C. isotopes and not atoms~~
- ~~D. atomic mass and not atomic weight~~

} bogus choices (x x)

10. What distinguishes one isotope from another such as in the three species of hydrogen; protium, deuterium and tritium is _____.

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Fill in the blank:

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Word bank fill in the blank: properties, ~~groups~~, ~~periods~~, Mendeleev, ~~atomic number~~, ~~periodic~~, ~~electric forces~~

13. The modern periodic table is arranged very much like the Mendeleev table.
14. The elements are arranged in rows called periods.
15. In each period, the elements are arranged by order of atomic #.
16. The vertical columns of the periodic table are also called groups.
17. All the elements within a group have similar chemical properties.
18. The elements on the Periodic Table are arranged in this manner because they have repeating predictable periodic chemical and physical properties that they share.
19. Atoms are attracted to one another by electric forces.

20. What causes this periodic behavior of the elements? Why do the elements within a particular group have similar chemical behavior?

- Atoms are attracted to one another by electrical charge
- The number of protons ultimately determines how many electrons
- Electrons in turn ultimately determine how atoms react
- Thus, the chemical behavior of an element is determined by the outer valence electrons. Electrons orbiting nucleus

21. Quantum Theory "the gist" -

Electrons "orbit" the nucleus in discrete shells or quanta. They are held there by the nucleus. Absorbing or releasing energy means they jump from one shell to another.

The duality -

The idea that matter has properties resembling those of waves. Particularly e^- has been discussed in class acting as particles one min. & waves the next.

22. Elements in the same group in the periodic table have the same number of electrons in their outer shells.

This causes them to have _____

- A. the same valence electron configuration and thus similar chemical reactivity.
- B. distinct proton formations
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