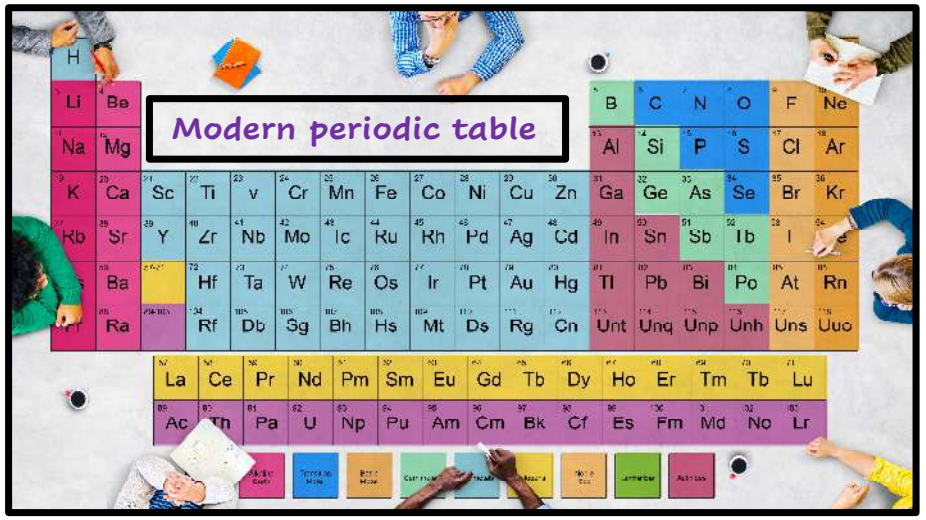
The first periodic tables were incomplete, and _____ were often placed in the wrong group. The modern periodic table is arranged In order of _____ (proton) number. There are around 100 known elements.
Elements in the same group have similar _____ and the same number of outer electrons and elements in periods have the same number of _____ (energy levels). The discovery of _____ confirmed that Mendeleev was correct not to place elements in order of atomic mass. This is because isotopes of the same element have different atomic _____ but have the same chemical Properties, so occupy the same position in the periodic table.

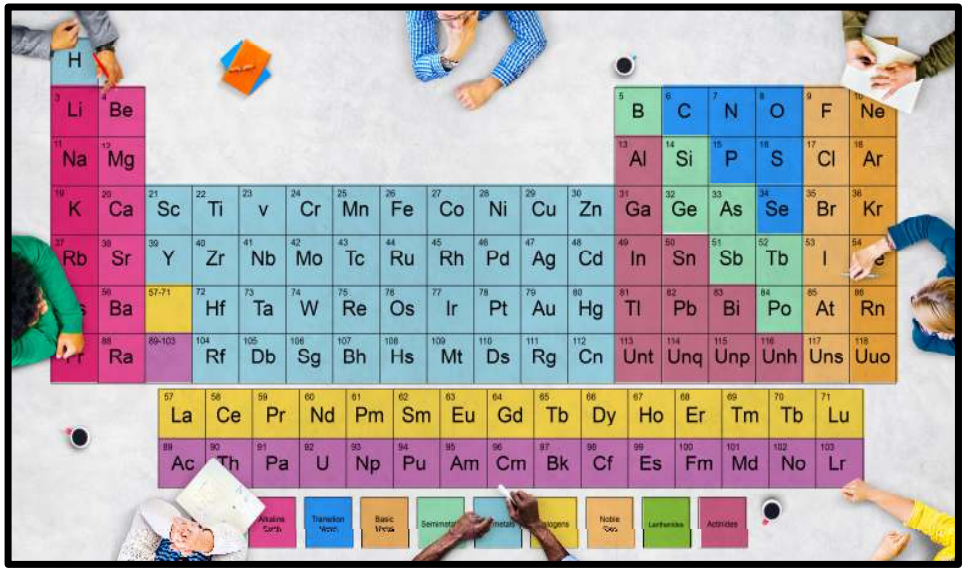



**isotopes** **masses**

**atomic** **elements**

**shells** **properties**


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| H | | | | | | | |
| Li | Be | B | C | N | O | F | |
| Na | Mg | Al | Si | P | S | Cl | |
| K Cu | Ca Zn | ? ? | Ti ? | V As | Cr Se | Mn Br | Fe Co Ni |
| Rb Ag | Sr Cd | Y In | Zr Sn | Nb Sb | Mo Te | ? I | Ru Rh Pd |



# METALS AND NON METALS

Atoms generally react to form a full [ ] shell of [ ]. This could be two electrons in their outer shell or [ ] electrons. Metals to the left of the periodic table lose electrons to form [ ] ions and non-metals to the right of the periodic table gain electrons to form [ ] ions. Metals are [ ] but can be bent or hammered into shapes (they are malleable) and they are very good at [ ] electricity. Metals have high [ ] and boiling points. Non-metals don't conduct electricity and are brittle with a low [ ].

**conducting**

**negative**

**outer**

**density**

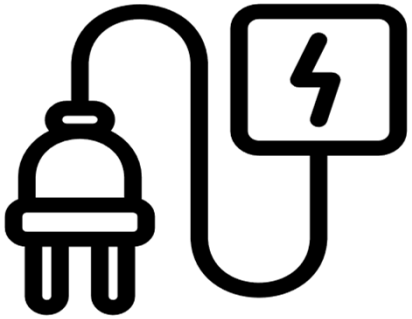
**positive**

**strong**

**melting**

**electrons**

**eight**



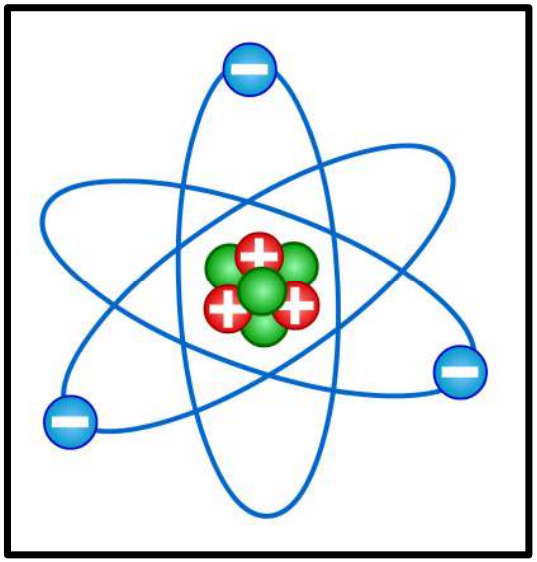
# BOHR'S NUCLEAR MODEL BLANKETY BLANK!

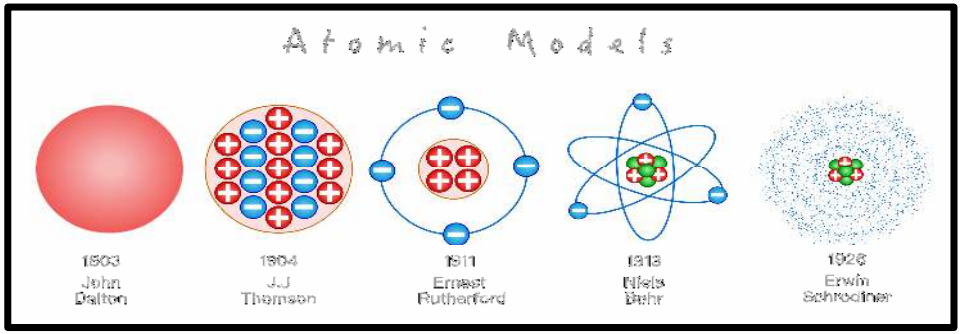
When scientists found that the [ ] around the nucleus of the atom would be attracted to the [ ], they thought it would cause the atom to collapse. Bohr suggested that [ ] must be contained in shells (energy levels) and proposed that the electrons [ ] the nucleus in fixed positions. Each shell (energy level) is a [ ] distance from the nucleus. Bohr's theory of [ ] structure was supported by many [ ], and it helped to explain the observations of other Scientists at that time.

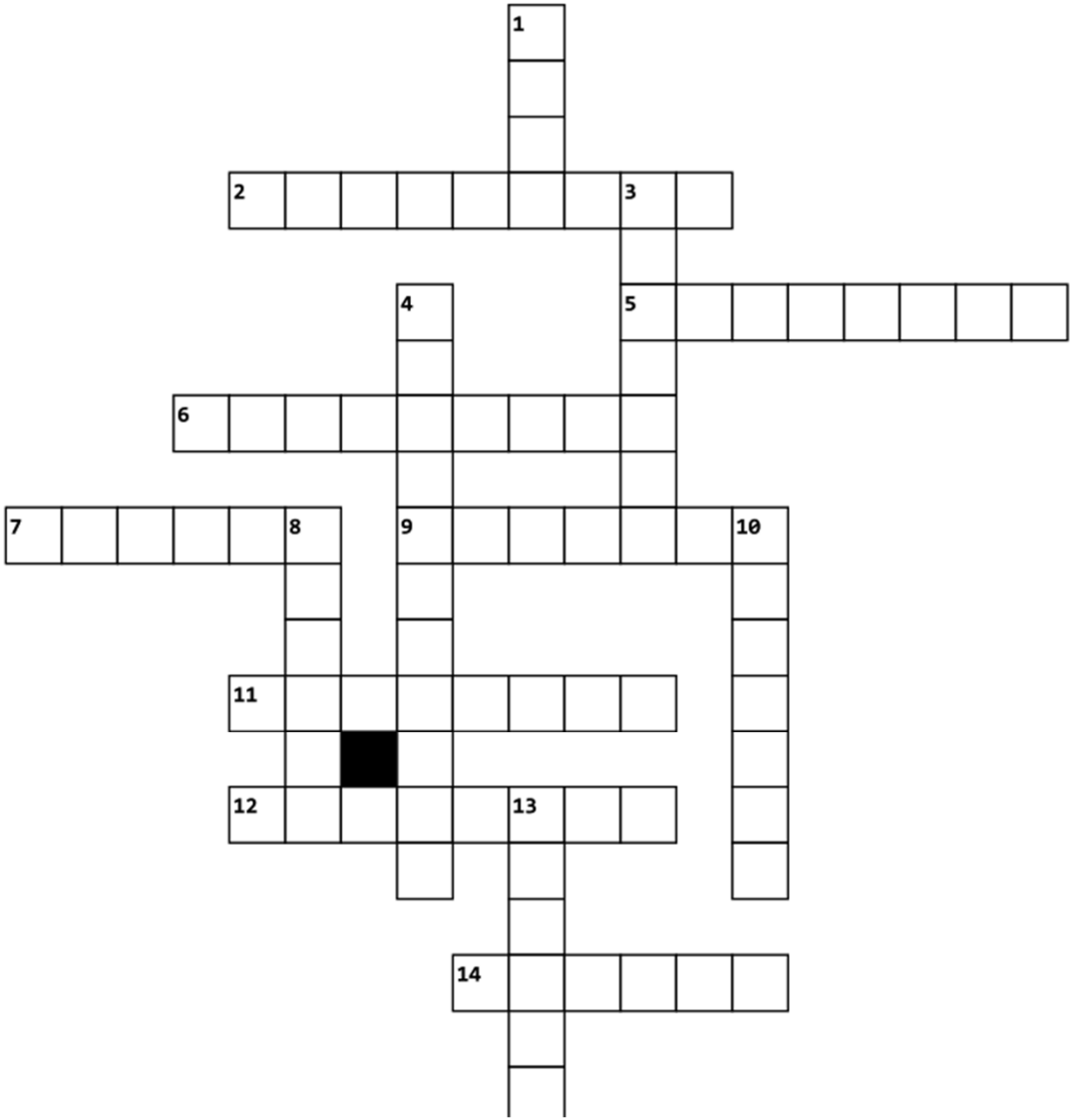
**THE DISCOVERY OF PROTONS AND NEUTRONS**

Further experiments showed that the nucleus could be divided into smaller [ ] (sub-atomic particles) each of which has the same charge as a hydrogen nuclei. Scientists in the 1920's referred to these particles as protons. James [ ] then carried out experiments to provide evidence for a neutral particle called the [ ] which was contained in the nucleus. All these experiments led to the discovery of the nuclear [ ].

**orbited**
**cloud**
**atomic**
**model**
**Chadwick**
**experiments**
**electrons**
**fixed**
**neutron**
**particles**
**nucleus**








## Across

**2.** Found in the outer shell of atoms and determine which group the element is in

**5.** Scientist who discovered the neutron

**6.** A property of metals meaning they can be bent into particular shapes

**7.** An arrangement in the periodic table where elements have similar properties

**9.** The scientist who discovered the electron

**11.** A negatively charged sub-atomic particle

**12.** Elements with the same number of protons but a different mass number/number of neutrons

**14.** The number for how the periodic table is arranged

## Down

**1.** The scientist who proposed electrons orbit the nucleus

**3.** The central part of an atom

**4.** Metals conduct this very well

**8.** Fixed paths where electrons orbit the nucleus

**10.** A sub-atomic particle with no charge

**13.** Positively charged particle in the nucleus

NAME _____

---

## 🧪 Atomic Structure & Periodic Table Quiz

**1. What did scientists first think would happen to the atom because of the attraction between electrons and the nucleus?**

A. It would expand

B. It would collapse

C. It would become neutral

D. It would emit radiation

**2. What did Bohr suggest to prevent atomic collapse?**

A. Electrons are fixed in the nucleus

B. Electrons orbit in fixed shells

C. Electrons are randomly scattered

D. Electrons are repelled by the nucleus

**3. What is true about Bohr's energy levels?**

A. They vary randomly

B. They are fixed distances from the nucleus

C. They are only found in metals

D. They are inside the nucleus

**4. Which particle has the same charge as a hydrogen nucleus?**

A. Neutron

B. Proton

C. Electron

D. Alpha particle

**5. Who discovered the neutron?**

A. JJ Thomson

B. Ernest Rutherford

C. James Chadwick

D. Niels Bohr

**6. What is the charge of a neutron?**

A. Positive

B. Negative

C. Neutral

D. Variable

**7. What did JJ Thomson discover about atoms?**

A. They are solid spheres

B. They contain electrons

C. They are mostly empty space

D. They are made only of protons

**8. What model did JJ Thomson propose?**

A. Nuclear model

B. Bohr model

C. Plum pudding model

D. Quantum model

**9. What experiment did Rutherford conduct?**

A. Neutron bombardment

B. Alpha particle scattering

C. Electron beam

D. Hydrogen fusion

**10. What did Rutherford observe in his experiment?**

A. All particles deflected

B. No particles passed through

C. Most passed through, some deflected

D. All particles were absorbed

**11. What did Rutherford conclude about the atom?**

A. It is a solid sphere

B. It has no internal structure

C. It is made only of electrons

D. It has a small nucleus and mostly made up of empty space

**12. How is the modern periodic table arranged?**

A. Alphabetically

B. By atomic mass

C. By number of neutrons

D. By atomic number

**13. What do elements in the same group share?**

A. Same atomic mass

B. Same number of neutrons

C. Same number of outer electrons

D. Same number of protons

**14. What do elements in the same period share?**

A. Same number of shells

B. Same atomic mass

C. Same number of neutrons

D. Same number of protons

**15. Why did isotopes support Mendeleev's table?**

A. Isotopes are unstable

B. Isotopes have different chemical properties

C. Isotopes have same atomic number but different masses/number of neutrons

D. Isotopes are not found in nature

---

SWJ TUITION

**NAME** _____

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## 🧪 Periodic Table & Properties Quiz

**1. Why were the first periodic tables considered incomplete?**

A. They included only metals

B. They had too many elements

C. They were arranged by atomic number

D. Elements were often placed in the wrong group

**2. How is the modern periodic table arranged?**

A. By atomic mass

B. By atomic (proton) number

C. By alphabetical order

D. By number of neutrons

**3. Approximately how many elements are known today?**

A. 75

B. 50

C. 150

D. 100

**4. What do elements in the same group have in common?**

A. Same number of protons

B. Same number of neutrons

C. Same atomic mass

D. Same number of outer electrons

**5. What do elements in the same period share?**

A. Same atomic mass

B. Same number of shells (energy levels)

C. Same number of neutrons

D. Same number of outer electrons

**6. Why did the discovery of isotopes support Mendeleev's table?**

A. Isotopes are unstable

B. Isotopes have different chemical properties

C. Isotopes have different atomic masses but same chemical properties

D. Isotopes are not found in nature

**7. Why do atoms react with other atoms?**

A. To increase their atomic number

B. To become heavier

C. To form a full outer shell of electrons

D. To change their group in the periodic table

**8. What do metals on the left side of the periodic table tend to do?**

A. Gain electrons to form negative ions

B. Form covalent bonds

C. Lose electrons to form positive ions

D. Remain neutral

**9. Which of the following is a property of metals?**

A. Poor electrical conductivity

B. Low melting point

C. Malleability

D. Brittle structure

**10. Which of the following is a property of non-metals?**

A. Malleability

B. Good electrical conductivity

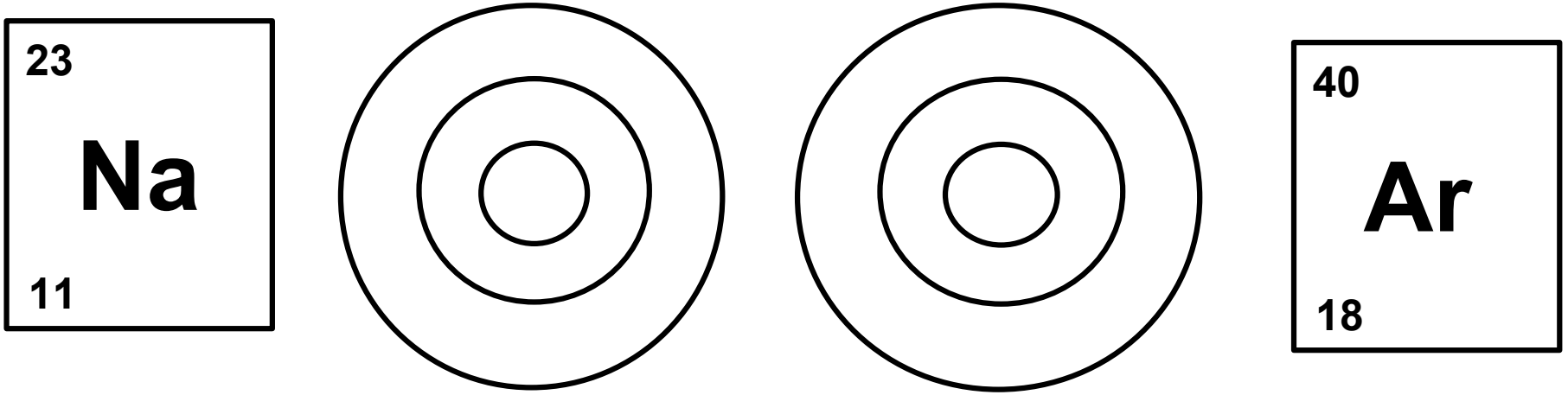
C. High density

D. Brittle structure

---

Fill in the table.

| Atom | Group Number | Electronic structure | Electrons gained or lost |
|---|---|---|---|
| Na | | | |
| Be | | | |
| K | | | |
| Cl | | | |
| S | | | |
| O | | | |
| F | | | |




Can you fill in the table?

| Shell (energy level) | Maximum number of electrons |
|---|---|
| 1st | |
| 2nd | |
| 3rd | |
| 4th | |