

Pause and Reflect Answer

As a positive ion, hydrogen behaves like a metal ion, while as a negative ion it behaves like a non-metal ion. This makes it unique. Students' diagrams should show a Bohr diagram for H^+ , which will have 1 proton and 0 electrons, as well as a Bohr diagram of H^- , which will have 1 proton and 2 electrons.

Other Assessment Opportunities

- BLM 1-28, Chapter 2 Quiz
- Assessment Checklist 1, Making Observations and Inferences
- Assessment Checklist 18, Data Table
- Assessment Checklist 24, K-W-L Assessment Checklist
- Assessment Checklist 25, Safety Checklist
- Process Skills Rubric 1, Developing Models
- Process Skills Rubric 7, Predicting
- Process Skills Rubric 8, Interpreting Data
- Assessment Rubric 1, Concept Rubric
- Assessment Rubric 3, Co-operative Group Work Rubric
- Assessment Rubric 5, Conduct an Investigation Rubric
- Assessment Rubric 12, Using Tools, Equipment, and Materials Rubric

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PREPARE YOUR OWN SUMMARY

Student summaries should incorporate the following main ideas:

1. Characteristics of Some Common Elements
 - Metals such as iron, sodium, and silver are shiny, silver/grey coloured, malleable, ductile, and conductive.
 - Non-metals such as hydrogen, oxygen, and chlorine are gases. However, they differ markedly in their reactivity.
 - Metalloids, such as silicon, have properties resembling both metals and non-metals.
2. Information Given in the Periodic Table
 - Each element has its own unique name and symbol.
 - The atomic number indicates how many protons are in an atom of the element.
 - The atomic mass gives the mass in atomic mass units (amu) of an average atom of that element.
 - Common ion charge indicates the ion(s) that the element can form in an ionic compound (some elements do not form an ion; others form more than one kind).

3. Chemical Families
 - Chemical families are groups of elements with similar properties.
 - Chemical families are found in vertical columns in the periodic table.
 - Four families are the alkali metals (group 1), the alkaline earth metals (group 2), the halogens (group 17), and the noble gases (group 18).
4. Bohr Model Diagrams
 - Bohr model diagrams show the number and arrangement of electrons in an atom or ion.
 - Electron arrangements are in the pattern 2, 8, 8, 18 for the first 36 elements.
5. How Valence Electrons Relate to Chemical Families
 - Elements in the same chemical family have the same number of valence electrons.
 - Noble gases have filled valence energy levels, making them chemically inert.
 - Metals lose valence electrons until their ion forms with a filled outside energy level.
 - Non-metals gain electrons until their ion forms with a filled valence energy level.

CHAPTER REVIEW ANSWERS

Checking Concepts

1. An element is a pure substance made of only one kind of atom. Specifically, all the atoms of the element have the same number of protons.
2. Accept all logical answers. For example, pennies contain copper and zinc, and ice cubes contain hydrogen and oxygen.
3. (a) Phosphorus
(b) Beryllium
(c) Potassium
(d) Cobalt
4. (a) He
(b) Li
(c) B
(d) Mg
(e) Ca
5. Mercury and bromine
6. Shiny, silver coloured, malleable, ductile, conduct electricity, conduct heat
7. (a) Carbon, other metals
(b) Steel
8. Mercury is liquid at room temperature and is not as good a conductor as silver.
9. Periodic table
10. Atomic mass measures the mass of an atom of the element.

11. Number of protons = atomic number
12. A chemical family is a group of elements that have similar chemical and physical properties. They occur in columns of the periodic table.
13. Alkali metals, alkaline earth metals, halogens, noble gases
14. Less reactive
15. They are unreactive.
16. A Bohr model represents the arrangement of electrons in an atom.
17. (a) The valence shell is the outermost occupied electron shell in an atom.
(b) A valence electron is an electron that occupies the valence shell.
18. (a) 1
(b) 3
(c) 6
(d) 8
19. (a) Noble gases
(b) Their filled valence shells make the atoms of the noble gases unreactive.

Understanding Key Ideas

20. Chemistry is the study of matter and its changes.
21. Atomic numbers increase from left to right and from top to bottom through the periodic table.
22. (a) 51
(b) 33
(c) 13
(d) 34
23. Hydrogen (1.0 amu)
Oxygen (16.0 amu)
Nitrogen (14.0 amu)
Rhenium (186.2 amu)
(a) Rhenium
(b) Hydrogen
24. (a) Germanium, neodymium
(b) Neptunium
(c) Germanium
(d) Nickel, germanium
(e) Nickel
25. (a) Americium
(b) Iron, ruthenium
(c) Uranium
26. H has the same number of valence electrons as Li, Na, and K.
27. Be 4p 2, 2
Mg 12p 2, 8, 2
Ca 20p 2, 8, 8, 2
28. (a) Aluminum
(b) Silicon
(c) Fluorine
(d) Neon

Pause and Reflect Answer

Accept all logical answers. For example: The periodic table helps not only by summarizing facts conveniently but also by showing patterns and trends in physical and chemical properties.