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Periodic Table: Groups, Trends & Atomic Numbers

Printable Flashcards — Pre-Med Chemistry

Groups, periods, blocks (s/p/d/f), atomic numbers of 40+ elements, periodic trends (atomic radius, ionization energy, electronegativity, metallic character), valence electrons, ion formation, and common exam traps.

218 cards — Print double-sided, flip on long edge, then cut along dashed lines.

218 cards — Printable Flashcards

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1

Group vs period: what's the difference?

2

In one sentence: why do elements in the same group behave similarly?

3

What does the atomic number (Z) tell you?

4

Trap: atomic number = number of neutrons. True or false?

5

Mass number (A) is...

6

Trap: the periodic table 'atomic mass' is usually an integer. True or false?

7

Main blocks of the periodic table are...

8

s-block elements are mainly in which groups?



2

They have the same number of valence electrons (main-group idea).

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1

Group = vertical column. Period = horizontal row.

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4

False.

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3

Number of protons in the nucleus (and equals electrons in a neutral atom).

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6

False.

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5

Protons + neutrons.

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8

Groups 1 and 2 (plus He).

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7

s-block, p-block, d-block, f-block.

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9

p-block elements are mainly in which groups?

10

d-block =

11

f-block =

12

Group numbering trap: modern IUPAC groups go from...

13

Atomic number (Z) = number of $\{\{c1::protons\}\}$.

14

The atomic number equals the number of _____ in the nucleus.

15

Group 1 (except H) are called...

16

Group 1 typical ion charge is...



10

Transition metals (groups 3-12).

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9

Groups 13-18.

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12

1 to 18.

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11

Lanthanides and actinides (the two detached rows).

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14

protons

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13

Atomic number (Z) = number of protons.

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16

+1.

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15

Alkali metals.

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17

Group 1 reactivity trend (metals):
going down the group, reactivity...

18

Trap: hydrogen is an alkali metal
because it's in group 1. True or false?

19

Group 2 are called...

20

Group 2 typical ion charge is...

21

Group 17 are called...

22

Group 17 typical ion charge is...

23

Halogen reactivity trend: going
down group 17, reactivity...

24

Group 18 are called...



18

False.

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17

Increases.

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20

+2.

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19

Alkaline earth metals.

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22

-1 (halide ions).

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21

Halogens.

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24

Noble gases.

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23

Decreases.

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25

Why are noble gases usually unreactive?

26

Trap: helium has 8 valence electrons because it's in group 18. True or false?

27

Group 13 (like Al) typical ion charge is...

28

Group 14 (C/Si family) common oxidation states are often...

29

Group 15 (N/P family) typical ion charge is often...

30

Group 16 (O/S family) typical ion charge is often...

31

Transition metals (d-block) are known for...

32

Trap: all metals form only one common ion charge. True or false?



26

False.

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25

They already have a full valence shell.

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28

+4 and -4 (depends on element).

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27

+3.

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30

-2.

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29

-3 (for simple ionic idea).

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32

False.

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31

Variable oxidation states, colored compounds, and acting as catalysts.

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33

Metalloids are elements that behave kind of like...

34

Where are metalloids found on the periodic table (roughly)?

35

Group 17 are $\{\{c1::\text{halogens}\}\}$ and they usually form $\{\{c2::-1}\}$ ions.

36

Group 1 metals usually form $\{\{c1::+1}\}$ ions; group 2 metals usually form $\{\{c2::+2}\}$ ions.

37

Main-group shortcut: group number tells valence electrons for...

38

How many valence electrons do group 1 elements have?

39

How many valence electrons do group 2 elements have?

40

How many valence electrons do group 13 elements have?



34

Along the zig-zag 'staircase'
between metals and nonmetals.

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33

A mix of metals and nonmetals (semi-metals).

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36

Group 1 metals usually form +1 ions;
group 2 metals usually form +2 ions.

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35

Group 17 are halogens and
they usually form -1 ions.

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38

1.

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37

Groups 1, 2, and 13-18.

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40

3.

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39

2.

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41

How many valence electrons do group 14 elements have?

42

How many valence electrons do group 15 elements have?

43

How many valence electrons do group 16 elements have?

44

How many valence electrons do group 17 elements have?

45

How many valence electrons do group 18 elements have (usually)?

46

Quick ionic charge shortcut for main-group elements:

47

Trap: group 15 elements always form -3 ions in real life. True or false?

48

Valence shortcut: group 13 has $\{\{c1::3\}\}$, 14 has $\{\{c2::4\}\}$, 15 has $\{\{c3::5\}\}$, 16 has $\{\{c4::6\}\}$, 17 has $\{\{c5::7\}\}$, 18 has $\{\{c6::8\}\}$ (He is 2).



42

5.

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41

4.

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44

7.

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43

6.

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46

Metals left side go + (lose e-), nonmetals right side go - (gain e-) to reach a full shell.

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45

8 (except He has 2).

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48

Valence shortcut: group 13 has 3, 14 has 4, 15 has 5, 16 has 6, 17 has 7, 18 has 8 (He is 2).

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47

False.

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49

How many valence electrons does a halogen (group 17) have?

50

Atomic radius trend: across a period (left -> right), atomic radius generally...

51

Atomic radius trend: down a group, atomic radius generally...

52

Ionization energy trend: across a period (left -> right), it generally...

53

Ionization energy trend: down a group, it generally...

54

Electronegativity trend: across a period, it generally...

55

Electronegativity trend: down a group, it generally...

56

Which element is the most electronegative?



50

Decreases.

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49

7

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52

Increases.

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51

Increases.

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54

Increases.

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53

Decreases.

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56

Fluorine (F).

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55

Decreases.

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57

Metallic character trend: across a period
(left -> right), metallic character...

58

Metallic character trend: down
a group, metallic character...

59

Reactivity trend for alkali metals
(group 1): down the group, reactivity...

60

Reactivity trend for halogens (group
17): down the group, reactivity...

61

Trap: atomic radius increases left ->
right across a period. True or false?

62

Trap: electronegativity decreases left -
> right across a period. True or false?

63

Why do group 1 metals get
more reactive down the group?

64

Why do halogens get less reactive down the group?



58

Increases.

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57

Decreases.

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60

Decreases.

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59

Increases.

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62

False.

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61

False.

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64

Bigger atoms have weaker attraction for an incoming electron (more shielding).

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63

The valence electron is farther from the nucleus and more shielded, so it's easier to lose.

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65

Across a period: atomic radius $\{\{c1::decreases\}\}$,
ionization energy $\{\{c2::increases\}\}$,
electronegativity $\{\{c3::increases\}\}$.

66

Down a group: atomic radius $\{\{c1::increases\}\}$,
ionization energy $\{\{c2::decreases\}\}$,
electronegativity $\{\{c3::decreases\}\}$.

67

Most electronegative element:

68

Where are metals mostly
located on the periodic table?

69

Where are nonmetals mostly located?

70

Metals usually form ions by...

71

Nonmetals usually form ions by...

72

Metalloids are useful in electronics
because they are often...



66

Down a group: atomic radius increases, ionization energy decreases, electronegativity decreases.

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65

Across a period: atomic radius decreases, ionization energy increases, electronegativity increases.

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68

Left side and center.

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67

Fluorine

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70

Losing electrons (cations).

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69

Top-right (plus hydrogen).

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72

Semiconductors.

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71

Gaining electrons (anions).

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73

Trap: silicon is a metal because it conducts electricity. True or false?

74

Quick list of common metalloids (pre-med level):

75

Metals tend to $\{\{c1::lose\}\}$ electrons;
nonmetals tend to $\{\{c2::gain\}\}$ electrons.

76

Atomic number (proton number) of Hydrogen (H):

77

IUPAC group number of Hydrogen (H):

78

Atomic number (proton number) of Helium (He):

79

IUPAC group number of Helium (He):

80

Atomic number (proton number) of Lithium (Li):



74

B, Si, Ge, As, Sb, Te.

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73

False.

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76

1

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75

Metals tend to lose electrons;
nonmetals tend to gain electrons.

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78

2

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77

1

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80

3

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79

18

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81

IUPAC group number of Lithium (Li):

82

Atomic number (proton number) of Beryllium (Be):

83

IUPAC group number of Beryllium (Be):

84

Atomic number (proton number) of Boron (B):

85

IUPAC group number of Boron (B):

86

Atomic number (proton number) of Carbon (C):

87

IUPAC group number of Carbon (C):

88

Atomic number (proton number) of Nitrogen (N):



82

4

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81

1

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84

5

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83

2

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86

6

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85

13

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88

7

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87

14

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89

IUPAC group number of Nitrogen (N):

90

Atomic number (proton number) of Oxygen (O):

91

IUPAC group number of Oxygen (O):

92

Atomic number (proton number) of Fluorine (F):

93

IUPAC group number of Fluorine (F):

94

Atomic number (proton number) of Neon (Ne):

95

IUPAC group number of Neon (Ne):

96

Atomic number (proton number) of Sodium (Na):



90

8

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89

15

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92

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94

10

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93

17

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96

11

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95

18

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97

IUPAC group number of Sodium (Na):

98

Atomic number (proton number) of Magnesium (Mg):

99

IUPAC group number of Magnesium (Mg):

100

Atomic number (proton number) of Aluminum (Al):

101

IUPAC group number of Aluminum (Al):

102

Atomic number (proton number) of Silicon (Si):

103

IUPAC group number of Silicon (Si):

104

Atomic number (proton number) of Phosphorus (P):



98

12

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97

1

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100

13

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99

2

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102

14

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101

13

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104

15

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103

14

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105

IUPAC group number of Phosphorus (P):

106

Atomic number (proton number) of Sulfur (S):

107

IUPAC group number of Sulfur (S):

108

Atomic number (proton number) of Chlorine (Cl):

109

IUPAC group number of Chlorine (Cl):

110

Atomic number (proton number) of Argon (Ar):

111

IUPAC group number of Argon (Ar):

112

Atomic number (proton number) of Potassium (K):



106

16

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105

15

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108

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107

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112

19

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111

18

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113

IUPAC group number of Potassium (K):

114

Atomic number (proton number) of Calcium (Ca):

115

IUPAC group number of Calcium (Ca):

116

Atomic number (proton number) of Scandium (Sc):

117

IUPAC group number of Scandium (Sc):

118

Atomic number (proton number) of Titanium (Ti):

119

IUPAC group number of Titanium (Ti):

120

Atomic number (proton number) of Vanadium (V):



114

20

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113

1

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116

21

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115

2

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118

22

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117

3

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120

23

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119

4

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121

IUPAC group number of Vanadium (V):

122

Atomic number (proton number) of Chromium (Cr):

123

IUPAC group number of Chromium (Cr):

124

Atomic number (proton number) of Manganese (Mn):

125

IUPAC group number of Manganese (Mn):

126

Atomic number (proton number) of Iron (Fe):

127

IUPAC group number of Iron (Fe):

128

Atomic number (proton number) of Cobalt (Co):



122

24

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121

5

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124

25

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123

6

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126

26

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125

7

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128

27

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127

8

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129

IUPAC group number of Cobalt (Co):

130

Atomic number (proton number) of Nickel (Ni):

131

IUPAC group number of Nickel (Ni):

132

Atomic number (proton number) of Copper (Cu):

133

IUPAC group number of Copper (Cu):

134

Atomic number (proton number) of Zinc (Zn):

135

IUPAC group number of Zinc (Zn):

136

Atomic number (proton number) of Bromine (Br):



130

28

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129

9

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132

29

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131

10

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134

30

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133

11

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136

35

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135

12

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137

IUPAC group number of Bromine (Br):

138

Atomic number (proton number) of Krypton (Kr):

139

IUPAC group number of Krypton (Kr):

140

Atomic number (proton number) of Silver (Ag):

141

IUPAC group number of Silver (Ag):

142

Atomic number (proton number) of Tin (Sn):

143

IUPAC group number of Tin (Sn):

144

Atomic number (proton number) of Iodine (I):



138

36

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137

17

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140

47

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139

18

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142

50

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141

11

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144

53

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143

14

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145

IUPAC group number of Iodine (I):

146

Atomic number (proton number) of Xenon (Xe):

147

IUPAC group number of Xenon (Xe):

148

Atomic number (proton number) of Gold (Au):

149

IUPAC group number of Gold (Au):

150

Atomic number (proton number) of Mercury (Hg):

151

IUPAC group number of Mercury (Hg):

152

Atomic number (proton number) of Lead (Pb):



146

54

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145

17

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148

79

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147

18

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150

80

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149

11

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152

82

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151

12

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153

IUPAC group number of Lead (Pb):

154

Group 16 family name is...

155

Group 15 family name is...

156

Group 14 is the...

157

Group 13 is the...

158

Period number tells you (roughly) how many...

159

Why do alkali metals react so easily?

160

Classic reaction idea: alkali metal + water ->



154

Chalcogens (oxygen family).

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153

14

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156

Carbon group.

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155

Pnictogens (nitrogen family).

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158

Electron shells (energy levels) the atom has.

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157

Boron group.

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160

Metal hydroxide + hydrogen gas.

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159

They REALLY want to lose their 1 valence electron.

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161

Alkaline earth metals are generally... compared to alkali metals (reactivity).

162

Halogens are strong oxidizing agents because they...

163

Halogens exist as diatomic molecules in elemental form, like...

164

Down group 17, melting/boiling points generally...

165

Noble gases are monoatomic (they exist as single atoms) because...

166

Trap: chlorine is a noble gas because it's on the right side. True or false?

167

Period = $\{\{c1::row\}\}$; group = $\{\{c2::column\}\}$.

168

Element with atomic number 1:



162

Really want to gain 1 electron.

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161

Less reactive.

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164

Increase.

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163

F₂, Cl₂, Br₂, I₂.

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166

False.

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165

They don't need to bond to fill their valence shell.

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168

Hydrogen (H)

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167

Period = row; group = column.

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169

Element with atomic number 2:

170

Element with atomic number 3:

171

Element with atomic number 4:

172

Element with atomic number 5:

173

Element with atomic number 6:

174

Element with atomic number 7:

175

Element with atomic number 8:

176

Element with atomic number 9:



170

Lithium (Li)

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169

Helium (He)

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172

Boron (B)

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171

Beryllium (Be)

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174

Nitrogen (N)

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173

Carbon (C)

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176

Fluorine (F)

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175

Oxygen (O)

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177

Element with atomic number 10:

178

Element with atomic number 11:

179

Element with atomic number 12:

180

Element with atomic number 13:

181

Element with atomic number 14:

182

Element with atomic number 15:

183

Element with atomic number 16:

184

Element with atomic number 17:



178

Sodium (Na)

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177

Neon (Ne)

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180

Aluminum (Al)

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179

Magnesium (Mg)

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182

Phosphorus (P)

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181

Silicon (Si)

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184

Chlorine (Cl)

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183

Sulfur (S)

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185

Element with atomic number 18:

186

Element with atomic number 19:

187

Element with atomic number 20:

188

Element with atomic number 26:

189

Element with atomic number 29:

190

Element with atomic number 30:

191

Element with atomic number 35:

192

Element with atomic number 47:



186

Potassium (K)

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185

Argon (Ar)

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188

Iron (Fe)

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187

Calcium (Ca)

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190

Zinc (Zn)

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189

Copper (Cu)

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192

Silver (Ag)

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191

Bromine (Br)

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193

Element with atomic number 53:

194

Element with atomic number 79:

195

Element with atomic number 80:

196

Element with atomic number 82:

197

Group 1, period 3 element:

198

Group 2, period 3 element:

199

Group 17, period 3 element:

200

Group 18, period 3 element:



194

Gold (Au)

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193

Iodine (I)

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196

Lead (Pb)

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195

Mercury (Hg)

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198

Magnesium (Mg)

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197

Sodium (Na)

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200

Argon (Ar)

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199

Chlorine (Cl)

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201

Group 14, period 2 element:

202

Group 16, period 2 element:

203

Group 17, period 2 element:

204

Group 18, period 2 element:

205

Group 1, period 4 element:

206

Group 2, period 4 element:

207

Group 11 element commonly
used in wiring and coins:

208

Group 11 element famous for
jewelry and being unreactive:



202

Oxygen (O)

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201

Carbon (C)

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204

Neon (Ne)

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203

Fluorine (F)

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206

Calcium (Ca)

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205

Potassium (K)

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208

Gold (Au)

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207

Copper (Cu)

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209

Cation vs neutral atom size: a cation is usually...

210

Anion vs neutral atom size: an anion is usually...

211

Trap: Na^+ is bigger than Na because it has a positive charge. True or false?

212

Trap: Cl^- is smaller than Cl because it's 'stable'. True or false?

213

Why does the periodic table 'repeat' patterns across periods?

214

Period 1 has only 2 elements because...

215

s-block elements are called 's' because their last electron goes into...

216

Quick block cheat: group 1 ends with ... and group 2 ends with ... (electron-wise).



210

Larger.

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209

Smaller.

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212

False.

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211

False.

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214

The 1s orbital can hold only 2 electrons.

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213

Because electrons fill shells/subshells in a repeating way.

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216

Group 1 ends with s^1 , group 2 ends with s^2 .

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215

An s orbital.

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217

Quick block cheat: groups 13-18 fill the...

218

Ions: cations (lose e⁻) are usually
{c1::smaller}; anions (gain e⁻) are usually
{c2::larger} than the neutral atom.



218

Ions: cations (lose e-) are usually smaller; anions (gain e-) are usually larger than the neutral atom.

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217

p orbitals (p-block).

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