

Isotopes



The Atom

Atomic Number and Mass Number

1

Atomic Number on the Periodic Table

Atomic Number → **11** ← Proton Number

Symbol → **Na** ← Sodium

22.99

↑
ATOMIC MASS

Why is it a fraction?

2

...Atoms have isotopes

ISOTOPE: Atoms with the same number of protons, but different numbers of neutrons.

- **Atoms** of the same element all have the same number of protons.
- **Isotopes** of the element have differing numbers of neutrons

3

new term : **Mass Number**

Mass Number
is
the number of
protons and neutrons
in an atom

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Writing Isotopes in the language of chemistry

ELEMENT
OF SODIUM

11
Na
22.99

ISOTOPE
OF SODIUM

23 ← mass number
Na
11 ← atomic number

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Writing isotopes in the language of chemistry

EXAMPLE **Isotopes of chlorine**

³⁵Cl
17

chlorine - 35

³⁷Cl
17

chlorine - 37

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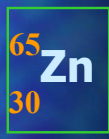
Practice Isotopes



8 p+
8 n



15 p+
16 n



30 p+
35 n

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Learning Check

Naturally occurring carbon consists of three isotopes, ^{12}C , ^{13}C , and ^{14}C .

State the number of protons, neutrons, and electrons in each of these carbon atoms.



#P _____

#N _____

#E _____

8

Solution



#P 6 6 6

#N 6 7 8

#E 6 6 6

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An atom of zinc has a mass number of 65.

1. Number of protons in the zinc atom
a) 30 b) 35 c) 65
2. Number of neutrons in the zinc atom
a) 30 b) 35 c) 65
3. What is the mass number of a zinc isotope with 37 neutrons?
a) 37 b) 65 c) 67

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Learning Check

Write the atomic symbols for atoms with the following:

- A. 8 p⁺, 8 n, 8 e⁻ _____
- B. 17p⁺, 20n, 17e⁻ _____
- C. 47p⁺, 60 n, 47 e⁻ _____

11

Solution

- A. 8 p⁺, 8 n, 8 e⁻ ¹⁶**O**
 8
- B. 17p⁺, 20n, 17e⁻ ³⁷**Cl**
 17
- C. 47p⁺, 60 n, 47 e⁻ ¹⁰⁷**Ag**
 47

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Learning Check

An atom has 14 protons and 20 neutrons.

1. Its atomic number is
a) 14 b) 16 c) 34
2. Its mass number is
a) 14 b) 16 c) 34
3. The element is
a) Si b) Ca c) Se
4. Another isotope of this element is
a) ${}_{16}^{34}\text{X}$ b) ${}_{14}^{34}\text{X}$ c) ${}_{14}^{36}\text{X}$

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