



Space Station Stumpers

A Quiz on All Things Atomic

Time

15 minutes

Questions and Answers

- 1) All matter is composed of _____. **A: Atoms or parts of atoms or molecules**
- 2) The four phases of matter are _____, _____, _____, _____.
A: liquids, solids, gases, plasma
- 3) One Greek philosopher that first used the word "atom" is _____.
A: Democritus or Leucippus
- 4) Early scientists believed that everything around them consisted of what 4 elements?
A: Fire, water, earth, ether
- 5) With one exception, what are the three main components of all atoms?
A: electrons, protons, neutrons
- 6) Which atom is the exception to the last question? Which component is missing?
A: Hydrogen has one proton and one electron. It has no neutrons.
- 7) What is an ion?
A: An ion is an atom with an electrical charge because it has one less or one more electron than normal.
- 8) Heat is created by submitting an atom or a group of atoms to what mechanical process? **A: "rubbing it" or applying friction.**
- 9) Neutrons and protons bind together to form the atom's _____.
A: nucleus.
- 10) An electron is how large compared to a proton?
A: 1/1836
- 11) An electron resides in an _____.
A: orbit (Bohr model), energy level, or electron cloud
- 12) If you increased the hydrogen atom's nucleus to a circumference of 3mm, how large is the new hydrogen atom?
A: 3 ¼ football fields.
- 13) The sun's plasma consists mostly of the ions of what two elements?
A: hydrogen and helium.
- 14) When we touch something, what actually comes into contact with what?
A: Magnetic fields come into contact with each other.
- 15) What scientist discovered that atoms consisted mainly of a perfect vacuum?
A: Dr. J.J. Rutherford
- 16) What is a molecule?
A: two or more atoms bound together
- 17) Name one example of a molecule and state how many atoms are in it.
A: water (3), carbon dioxide (3), hydrogen molecule (2), etc.

- 18) How fast does light travel through a vacuum? **A: 186,000 miles per second.**
- 19) Name two forms of electromagnetic radiation that are capable of ionizing the atoms in a human cell.
A: X-rays, gamma rays, and in some cases high-energy ultraviolet rays.
- 20) What was Einstein's famous formula? **A: $E=mc^2$**
- 21) What do the symbols in Einstein's formula stand for? **A: E=energy, m=mass, c=speed of light.**
- 22) How is light created? **A: Electrons are energized and move to higher energy levels. When they return to their original energy level, they emit photons of light.**
- 23) What thermonuclear force creates the tremendous heat in the core of the sun? **A: fusion**
- 24) What is fusion? **A: The bonding of hydrogen nuclei to form a new nucleus. (four hydrogen protons become one helium nucleus)**
- 25) What thermonuclear reaction is the opposite of fusion? **A: fission.**
- Bonus question: The sun produces what two things that threaten the astronauts? **A: Ionizing radiation (gamma rays and X-rays) and radioactive particles (protons and positrons)**