

**Grade 9 Science – Unit 1 Lesson 4**  
**Bill Nye – Atoms and Molecules**

ANSWER KEY

1. Things are made up of TINY pieces of stuff.
2. “Atoms” is from a Greek word meaning UNCUTABLE.
3. The heavy particles of the atom are in the MIDDLE / NUCLEUS. The LIGHT particles are on the outside. Atoms are mostly EMPTY SPACE
4. PROTONS and NEUTRONS are found in the nucleus. Their charges are POSITIVE and NEUTRAL, respectfully. ELECTRONS buzz around the nucleus at a HUGE distance away.
5. Electrons REPEL each other and move around so fast that the atom acts like a SOLID.
6. ONE MILLION atoms would fit on the head of a pin.
7. Atoms are the basic BUILDING BLOCKS of all matter.
8. When atoms combine, they can make MOLECULES
9. All matter is made of ATOMS and MOLECULES
10. Water is TWO parts HYDROGEN and ONE part OXYGEN. We know this because water can be split apart by ELECTROLYSIS
11. To “see” the spaces in matter, add one cup of water and one cup of ALCOHOL. The total volume is LESS THAN two cups, since alcohol has a lot of EMPTY SPACE between molecules, where water molecules can FILL
12. The number of PROTONS in the nucleus makes the atoms different. Elements have been arranged on a PERIODIC TABLE. The ATOMIC number represents the number of protons.
13. 92 elements occur naturally.
14. NaCl is SALT,  $C_3H_5N_3O_9$  is nitro-glycerine used to make DYNAMITE.
15. Inside protons and neutrons are QUARKS. These are studied by a NUCLEAR PHYSICIST
16. Everything in the universe is either ENERGY or MATTER. The smallest pieces of matter are ATOMS.
17. CARBON is in every living thing, like us. ORGANIC chemistry is the study of this element's compounds.