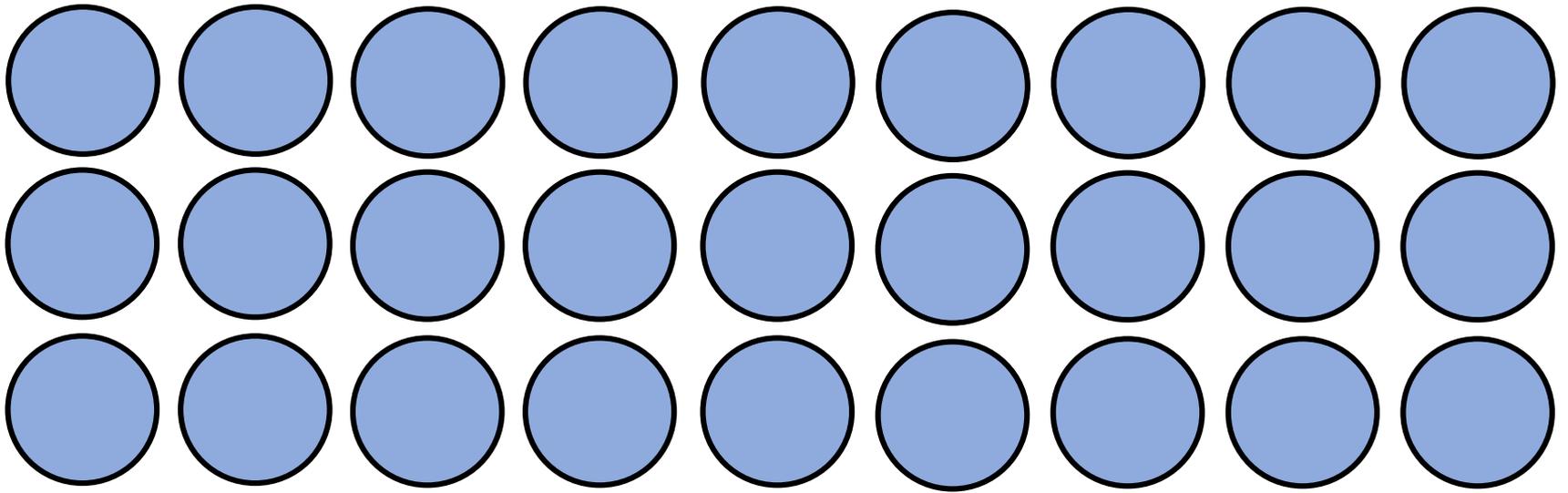


Teacher's Directions-Atom Building Manipulatives

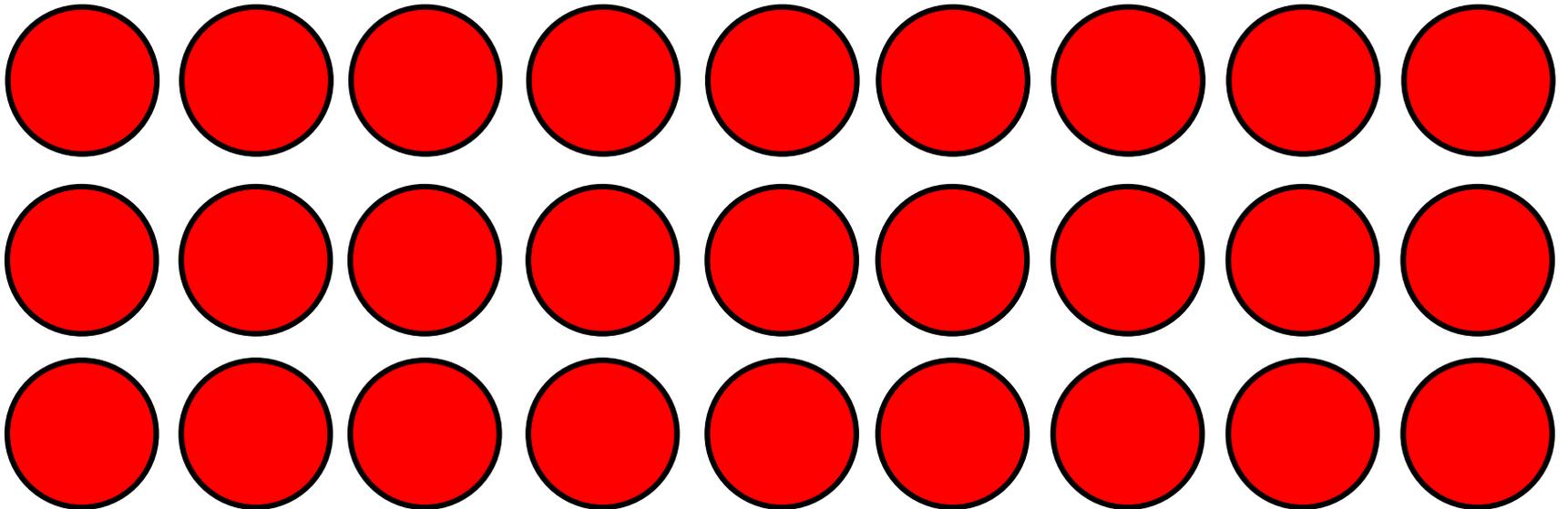
- Print onto cardstock. Cut out protons, neutrons and electrons. I found it easiest to cut through the circles and then tape them back together. I also found leaving a little bit of white to either side of the black energy level or orbit worked best.
- These manipulatives are meant to build elements 1-18. After 18, it becomes more complicated to place the electrons in the correct energy level.
- I would suggest introducing a few elements a day and teaching your children to read a periodic table to determine how to build each element. (Note: you can find periodic tables online or purchase a poster for your classroom.) The atomic number above the element symbol gives you the correct number of protons and electrons for that element in a neutrally charged state. By subtracting the atomic number from the mass (located below the element symbol), you can determine the number of neutrons needed to build the atom. (See below for how to place electrons in the correct energy level.) Instructions for building each element are on the next page in case you have questions when reading the periodic table.
- For the first three energy levels, fill the energy level closest to the nucleus before placing electrons in the next energy level. Energy Level 1 holds 2 electrons, Level 2 holds 8 electrons, and Level 3 initially holds 8 electrons. So for atoms with 1-2 electrons, you will only need the smallest energy level. For atoms with 3-10 electrons, you will add the second energy level. For atoms with 11-18 electrons, you will add the third energy level.

Instructions by Element

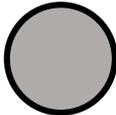
- Hydrogen: 1 proton, 0 neutrons, 1 electron, 1 energy level
- Helium: 2 protons, 2 neutrons, 2 electrons, 1 energy level
- Lithium: 3 protons, 4 neutrons, 3 electrons, 2 energy levels
- Beryllium: 4 protons, 5 neutrons, 4 electrons, 2 energy levels
- Boron: 5 protons, 6 neutrons, 5 electrons, 2 energy levels
- Carbon: 6 protons, 6 neutrons, 6 electrons, 2 energy levels
- Nitrogen: 7 protons, 7 neutrons, 7 electrons, 2 energy levels
- Oxygen: 8 protons, 8 neutrons, 8 electrons, 2 energy levels
- Fluorine: 9 protons, 10 neutrons, 9 electrons, 2 energy levels
- Neon: 10 protons, 10 neutrons, 10 electrons, 2 energy levels
- Sodium: 11 protons, 12 neutrons, 11 electrons, 3 energy levels
- Magnesium: 12 protons, 24 neutrons, 12 electrons, 3 energy levels
- Aluminum: 13 protons, 14 neutrons, 13 electrons, 3 energy levels
- Silicon: 14 protons, 28 neutrons, 14 electrons, 3 energy levels
- Phosphorus: 15 protons, 16 neutrons, 15 electrons, 3 energy levels
- Sulfur: 16 protons, 16 neutrons, 16 electrons, 3 energy levels
- Chlorine: 17 protons, 18 neutrons, 17 electrons, 3 energy levels
- Argon: 18 protons, 22 neutrons, 18 electrons, 3 energy levels



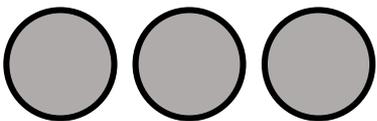
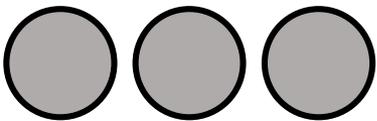
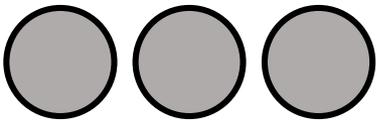
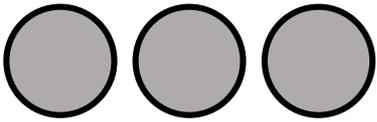
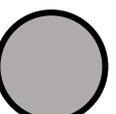
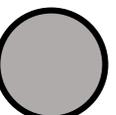
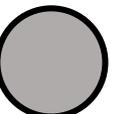
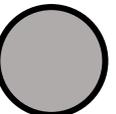
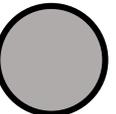
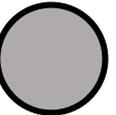
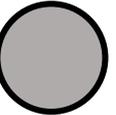
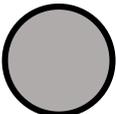
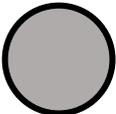
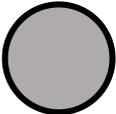
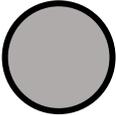
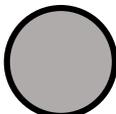
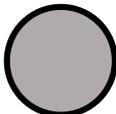
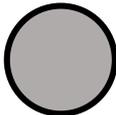
Neutrons



Protons



Electrons



Energy Levels

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