

The diagram shows the symbol for Lithium, ${}^7_3\text{Li}$. A box around the symbol has two callout lines. One points to the '7' and the other to the '3'.

This is known as the mass number. This is the number of protons and neutrons added together.

This is known as the atomic number or proton number. This is the number of protons in an atom.

Number of neutrons = mass number - atomic number

The number of electrons is the same as the number of protons in an atom.

Task 1

Using your periodic tables fill in the table below with the correct numbers.

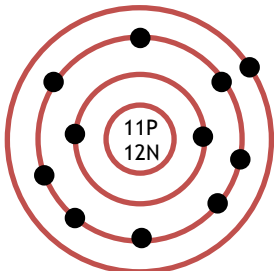
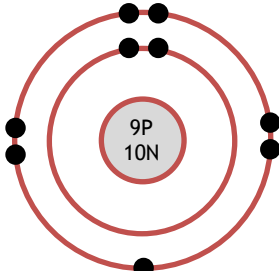
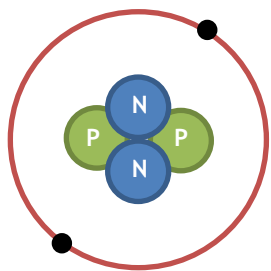
Clue: Some of the numbers will be the same. If you can work out which numbers they are, it will make filling in the table easier.

Element	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons
Hydrogen					
Helium					
Lithium					
Beryllium					
Boron					
Carbon					
Nitrogen					
Oxygen					
Fluorine					
Neon					
Sodium					
Magnesium					
Aluminium					
Silicon					
Phosphorus					
Sulfur					
Chlorine					
Argon					
Potassium					
Calcium					

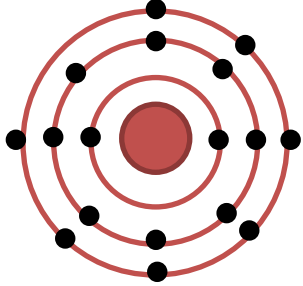
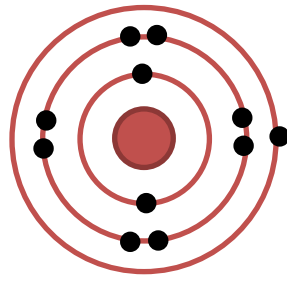
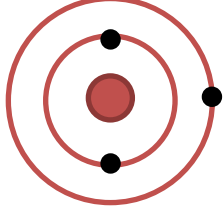
Task 2

Answer the following questions.

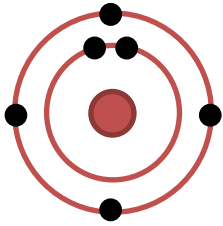
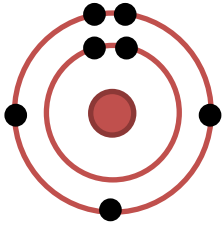
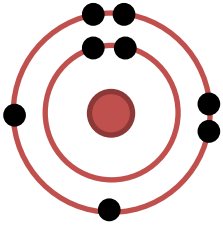
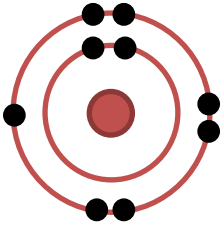
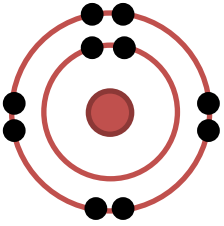
1. What is the pattern shown by the atomic numbers of the first 20 elements?
.....
2. Three of the numbers on the table are always the same for each element. Which three numbers are they?
.....
3. There is only one element that has a mass number that is not higher than its atomic number. Which element is it? Use the table to answer this question.
.....
4. Which element has the lowest mass?
5. Name the elements from the table with the same number of protons and neutrons.
.....
6. Look at the elements lithium, sodium, potassium and rubidium in the periodic table. What happens to their atomic numbers as you look down the column?
.....
7. Look at beryllium, magnesium, calcium and strontium. Do their atomic numbers change in the same way as the elements in question 3?
.....
8. Name these elements (P = protons, N = neutrons, small dots = electrons). Explain how you named these elements.

Element A	Element B	Element C
		
<p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p>

9. Name these elements using the diagrams. Explain how you named these elements. (Hint: The dots on circles are electrons. The number of protons and neutrons are not shown.)

Element A	Element B	Element C
		
<p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p>

10. How many neutrons do these atoms have? Explain how you worked this out.

Element A	Element B	Element C	Element D	Element E
				
Number of neutrons				
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>				

Answers

Element	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons
Hydrogen	1	1	1	0	1
Helium	2	4	2	2	2
Lithium	3	7	3	4	3
Beryllium	4	9	4	5	4
Boron	5	11	5	6	5
Carbon	6	12	6	6	6
Nitrogen	7	14	7	7	7
Oxygen	8	16	8	8	8
Fluorine	9	19	9	10	9
Neon	10	20	10	10	10
Sodium	11	23	11	12	11
Magnesium	12	24	12	12	12
Aluminium	13	27	13	14	13
Silicon	14	28	14	14	14
Phosphorus	15	31	15	16	15
Sulfur	16	32	16	16	16
Chlorine	17	35	17	18	17
Argon	18	40	18	22	18
Potassium	19	39	19	20	19
Calcium	20	40	20	20	20

1. They go up in 1s.
2. Atomic number, number of protons and number of electrons.
3. Hydrogen - mass number is 1 which is the same as its atomic number.
4. Hydrogen.
5. Helium, carbon, nitrogen, oxygen, neon, magnesium, silicon, sulfur, calcium.
6. They increase by 8.
7. Yes.
8. a) sodium, b) fluorine, c) helium

Add the neutrons and protons together to work out the mass number.
Or match the number of electrons (or protons) to the atomic number.

9. a) chlorine b) sodium c) lithium

The number of electrons equals the number of protons (which is the same as the atomic number). Find the element with that atomic number.

10. a) 6 neutrons b) 7 neutrons c) 8 neutrons d) 10 neutrons e) 10 neutrons

Look at the number of electrons. The number of electrons equals the number of protons, then look for the elements with the same atomic number as the number of electrons. Then take the mass number and subtract the atomic number from it.