

Year 11

Chemistry booklet

Topic 3 – Periodic table

Name: \_\_\_\_\_

## Periodic table

Give a definition for each of these key words:

|                          |  |
|--------------------------|--|
| Periodic table           |  |
| Noble gas                |  |
| Alkali metal             |  |
| Halogen                  |  |
| Giant covalent structure |  |
| Graphene                 |  |
| Fullerene                |  |
| Symbol equation          |  |
| State symbol             |  |
| Atom                     |  |
| Proton                   |  |
| Neutron                  |  |
| Electron                 |  |
| Isotope                  |  |
| Atomic number            |  |
| Mass number              |  |
| Polymer                  |  |



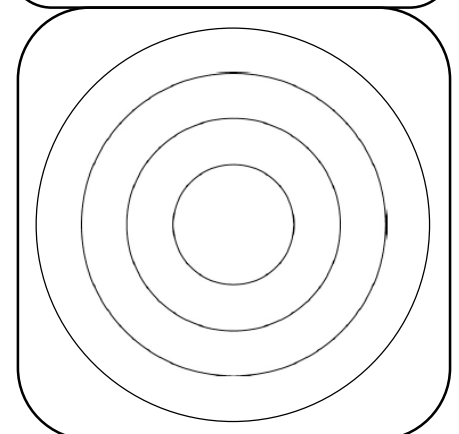
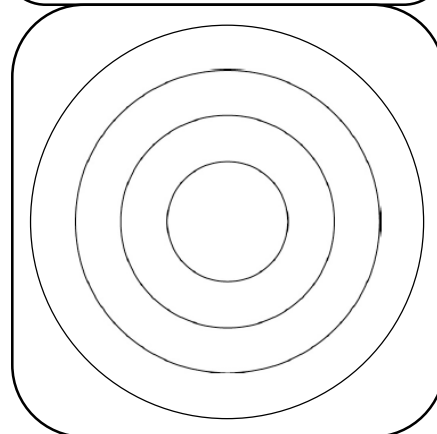
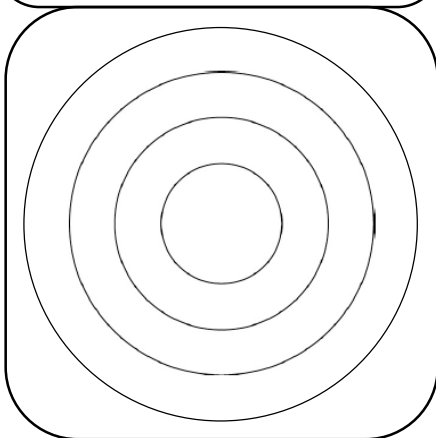
## Elements of the periodic table

- **The Group 1 metals** all have \_\_\_ electron in their highest energy level. This makes them highly \_\_\_\_\_
- The Group 1 metals react vigorously with oxygen to make a metal oxide  
lithium + oxygen → lithium oxide  
sodium + oxygen → \_\_\_\_\_
- The group 1 metals also react vigorously with water to make hydrogen and a metal oxide  
sodium + water → sodium hydroxide + hydrogen  
potassium + water → \_\_\_\_\_ + \_\_\_\_\_
  
- The highest energy level of **the noble gases** is always \_\_\_\_\_. No more electrons can join at that energy level
- This makes the noble gases highly \_\_\_\_\_
- All the noble gases, except helium, have \_\_\_ electrons in their highest energy level
- Helium has \_\_\_ electrons in its highest energy level
- The noble gases are in Group 0 of the periodic table
- \_\_\_\_\_ is used in balloons and airships
- \_\_\_\_\_ is used to make coloured lights
- \_\_\_\_\_ is used to make lasers

|           |               |
|-----------|---------------|
| 7         | Protons ___   |
| <b>Li</b> | Neutrons ___  |
| 3         | Electrons ___ |

|          |               |
|----------|---------------|
| 39       | Protons ___   |
| <b>K</b> | Neutrons ___  |
| 19       | Electrons ___ |

|           |               |
|-----------|---------------|
| 20        | Protons ___   |
| <b>Ne</b> | Neutrons ___  |
| 10        | Electrons ___ |



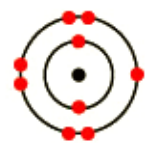
## Explaining the reactivity of **halogens**

As you go down Group \_\_\_\_\_ the atoms become larger, and the \_\_\_\_\_ shell becomes further from the nucleus. The force of attraction between the \_\_\_\_\_-charged nucleus and a negatively-charged \_\_\_\_\_ from another atom becomes weaker.

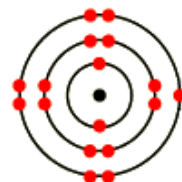
As a result, it becomes harder to \_\_\_\_\_ and gain an electron the larger the atom becomes. The more difficult it is to gain these outer electrons, the less \_\_\_\_\_ a halogen is.

For example chlorine is less reactive than fluorine because the outer electrons in a chlorine atom are further from the nucleus than the outer electrons in a fluorine atom. It is \_\_\_\_\_ for a chlorine atom to gain an electron than it is for a fluorine atom.

Astatine atoms, with 6 shells, are the largest atoms in Group 7. They are **very** \_\_\_\_\_ - now you know why.



fluorine atom,  
F 2,7



chlorine atom,  
Cl 2,8,7

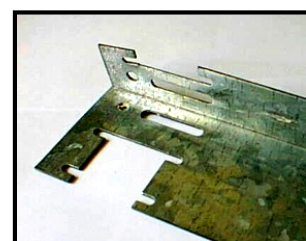
The **transition elements** are found between group ..... and ..... in the periodic table.

Which of the following are transition elements?

Cl      Na      Ni      Br      Zr      Zn

Which of the following are properties of transition metals? Circle your answers.

- Make coloured compounds
- Hard and tough
- Low melting point
- Violent reaction with acid
- Good conductors of heat and electricity
- Make colourless compounds
- Slow reaction with water and air
- Soft and brittle
- Vigorous reaction with water/air
- High melting point

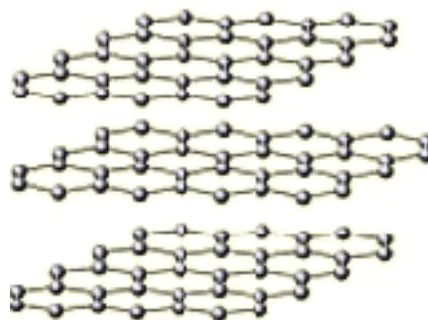
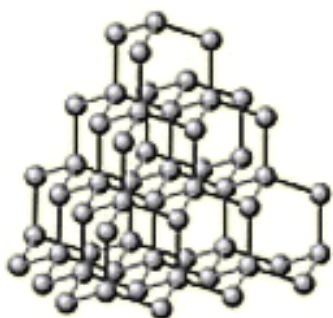


## Carbon and its uses

1. Which element are diamond and graphite made of? \_\_\_\_\_
2. What is an **allotrope**? \_\_\_\_\_
3. Complete this table with properties of diamond and graphite:

|                              | Diamond | Graphite |
|------------------------------|---------|----------|
| Appearance                   |         |          |
| Colour                       |         |          |
| Melting point                |         |          |
| Solubility                   |         |          |
| Does it conduct electricity? |         |          |
| Strength                     |         |          |
| Uses                         |         |          |

4. Use the diagrams below to describe the structures of diamond and graphite. Label each diagram and explain the following properties:
  - a. Why is diamond so much stronger than graphite?
  - b. Why does graphite conduct electricity but diamond doesn't?



5. Describe the structure of a **fullerene** \_\_\_\_\_  
\_\_\_\_\_
6. What is a **nanotube**? \_\_\_\_\_  
\_\_\_\_\_
7. Complete the table to explain these uses of nanotubes:

| Use                  | Explanation |
|----------------------|-------------|
| Delivering drugs     |             |
| Tennis rackets       |             |
| Spreading a catalyst |             |

