**Name:**

**TOP SECRET!**

***Question to be investigated***

What are the trends that are seen in the construction of the periodic table of elements? This activity is designed to help students identify trends and relationships that are identified in the periodic table.

You have been chosen for a top-secret mission. The mission, should you choose to accept it (and it is in your best interest that you do), is to work with the sketches of the characters contained in the envelope. These represent members of a family of secret agents, but the most important member has never been sketched. You are to organize the pictures and sketch the missing secret agent.

**CLUE ONE**: You could begin by grouping the people by similar characteristics or you could, sequence the pictures. For example, if you were given 100 cards with numbers from 0 to 99 on them, you could put them all in one long row from 0 to 99. Then you could make shorter rows and create columns, still maintaining the original order.

0 1 2 3 4 5 6 7 8 9

10 11 12 13 14 15 16 17 18 19

20 21 22 23 24 26 27 28 29

30 31 32 33 34 35 36 37 38 39 etc.

In this arrangement each ROW has something in common; the first row contains single digits and the remaining rows contain numbers beginning with the same number. Each COLUMN has something in common; they all end with the same number. You can tell the missing number must begin with 2 and end with 5.

You must apply the same thinking when you arrange the secret agents by identifying their characteristics. They have hair, body designs, fingers, arms, expressions, body sizes, etc.

**CLUE TWO**: Each secret agent is different from every other one in TWO of the properties. No two sketches have the same amount or kind of these properties.

If you can find one of these two, it will be possible to sequence the sketches correctly.

**CLUE THREE**: You will have three rows when you are finished. The rows DO NOT have to have the same number of sketches in each row. The goal is that all members of a row will have something in common and all members of a column have something in common.

If you do not accomplish this task in 30 minutes, this envelope will self-destruct! GOOD LUCK!

**How to Use the Periodic Table**

Bubble Family

After figuring out the Bubble Family activity with your group, answer the following questions:

1.) How did you decide to organize your family members?

2.) When you look from LEFT to RIGHT at the Bubble Family, what do you notice about the family members?

3.) When you look from TOP to BOTTOM, what do you notice?

4.) Draw the missing family member:

Today you’re going to learn about the Periodic Table. The Periodic Table is a table that organizes different type of atoms or elements in an easy-to read way. Elements are materials made out of just 1 type of atom. Each box in the periodic table contains information about each type of atom. Take a look at the periodic table at the back of your calendar.

The first thing the periodic table tells is the name and the symbol of each element (type of atom). I want you to practice with that:

Ex.

The element is hydrogen and the symbol is H.

1

H

Hydrogen

1.01

Practice:

3

Li

Lithium

6.94

2

He

Helium

4.00

The element is \_\_\_\_\_\_\_\_\_\_ The element is \_\_\_\_\_\_\_\_\_\_

and the symbol is \_\_\_\_\_ and the symbol is \_\_\_\_\_

Now look at the periodic table on the back of the packet. Find the element names for all of these atomic symbols.

1. Ca \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 7. F \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 13. Xe \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Zr \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 8. N \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 14. Po \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Na \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 9. Cl \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 15. Si \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Ge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 10. Ar \_\_\_\_\_\_\_\_\_\_\_\_\_ 16. Rn \_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. P \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 11. Kr \_\_\_\_\_\_\_\_\_\_\_\_\_ 17. Al \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 12. Br \_\_\_\_\_\_\_\_\_\_\_\_\_ 18. Ni \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Find the symbols for these element names.

19. Copper \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 23. Molybdenum \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. Tungsten \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 24. Strontium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21. Barium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 25. Magnesium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

22. Cesium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 26. Silver \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The second thing the periodic table tells you is the **atomic number** **(the number of protons/electrons).**

1

H

Hydrogen

1.01

This number is the atomic number. It tells us that hydrogen has **1 proton and 1 electron.**

Ex.

Hydrogen’s atomic number is **1.** It has **1 proton**. And since it has **1 proton,** to balance out the atom, it has **1 electron**

Practice:

2

He

Helium

4.00

3

Li

Lithium

6.94

Helium’s atomic number Lithium’s atomic number

Atomic #:\_\_\_\_\_\_\_ Atomic #: \_\_\_\_\_\_

# of protons: \_\_\_\_\_\_ # of protons: \_\_\_\_\_\_

# of electrons: \_\_\_\_\_\_ # of electrons: \_\_\_\_\_\_\_

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Atomic #** | **# of protons** | **# of electrons** | **Element** | **Atomic #** | **# of protons** | **# of electrons** |
| 1. Ca |  |  |  | 8. N |  |  |  |
| 2. Zr |  |  |  | 9. Cl |  |  |  |
| 3. Na |  |  |  | 10. Ar |  |  |  |
| 4. Ge |  |  |  | 11. Kr |  |  |  |
| 5. P |  |  |  | 12. Br |  |  |  |
| 6. O |  |  |  | 13. Xe |  |  |  |
| 7. F |  |  |  | 14. Po |  |  |  |

The third you need to know is what we call the columns and rows of the periodic table.

Going **up and down** on the periodic table (the columns) are called **groups.**



Going **left and right** on the periodic table (row) are called **periods.**

groups

Go to the **periodic table attached to the packet**. Find **HYDROGEN.** Hydrogen is in **group 1, period 1**.

Helium is in **group 18, period 1.**

Cobalt (27) is in **group 9, period 4.**

Calcium(20) is in **group 2**, **period 4.**

Find the following elements:

Cesium: period \_\_\_\_\_\_\_, group \_\_\_\_\_\_\_

periods

Potassium: period \_\_\_\_\_, group \_\_\_\_\_\_\_

Lithium: period \_\_\_\_\_\_, group \_\_\_\_\_\_\_

Silicon: period \_\_\_\_\_\_\_, group \_\_\_\_\_\_\_\_

Sulfur: period \_\_\_\_\_\_\_, group \_\_\_\_\_\_\_\_\_

Argon: period \_\_\_\_\_\_\_, group \_\_\_\_\_\_\_\_\_\_