Remember that the atoms of all elements tend to lose electrons when they

Gaining electrons from chemical bonds. On the other hand, the atoms of the halogens tend to

occupy the outer (valent) energy level.

because their atoms have the same number of electrons in the highest

Energy levels are the same group of elements have similar properties. That's

why we arrange the elements in order of their atomic (proton) number. This

gives us the periodic table. The periodic table is a model that shows the elements in groups

physical and chemical properties show this. We use the periodic table to predict the properties of

elements in groups. We can see why elements in the same group usually have similar properties.

The periodic table is also useful for finding trends in properties and predicting the properties of

new elements. For example, when we know how to arrange the elements in order of their atomic

number, we can predict how they will react with other elements.

One of the first scientists to arrange the elements in order of their atomic number was Mendeleev. He

predicted the properties of elements that had not yet been discovered. Mendeleev arranged all of these

elements in the order of their atomic number. Then in 1895, the Russian scientist Dmitri Mendeleev completed the periodic table.

The periodic table is a useful tool for chemists. It helps us understand the behavior of elements and

predict their properties. It also helps us predict the properties of elements that have not yet been

discovered. The periodic table is a model that shows the elements in groups and tells us about their

properties. It is a tool that helps us understand chemistry.

In this book, a new system of chemical philosophy,

measured in various modern chemical reactions. In 1869, Mendeleev published a table of elements

which showed the elements in order of their atomic number. The periodic table is a model that shows the

behavior of elements. It helps us predict the properties of elements and

their uses in various modern chemical reactions.

One of the first suggestions came from John Dalton, a teacher who lived most of his life in Liverpool.

Understanding more about chemistry.

In 1807, John Newlands builds his own version of the periodic table. He divides the elements into groups

but not all elements do this. Some elements are located in a group with elements that have similar properties.

If we put the elements in order of the mass of their atoms, most elements end

up in a group which contains elements that have similar properties. This periodic table produces patterns which were

recognized and accepted. It had its limitations.

Unfortunately, the elements are not located in a group with elements that have similar properties. This periodic table produces patterns which were

recognized and accepted. It had its limitations.
<table>
<thead>
<tr>
<th>Alkali metals</th>
<th>Alkaline earth metals</th>
<th>Representative metals</th>
<th>过渡金属</th>
<th>金属oids</th>
<th>非金属</th>
<th>noble gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na</td>
<td>Mg</td>
<td>Li</td>
<td>Be</td>
<td>B</td>
<td>C</td>
<td>He</td>
</tr>
<tr>
<td>Rb</td>
<td>Sr</td>
<td>Cs</td>
<td>Ba</td>
<td>Ra</td>
<td>Fr</td>
<td>Ac</td>
</tr>
</tbody>
</table>

Elements 58–71 and 90–103 (all metals) have been omitted.

**Key**
- Reactive metals: These metals react vigorously with other elements like oxygen or chlorine, and with water. They are all soft — some of them can even be cut with a knife, like cheese!
- Non-metals: These elements have low melting and boiling points, and many are liquids or gases at room temperature and pressure.
- Noble gases: These (non-metal) elements are very unreactive, and it is very difficult to get them to combine with other elements.

**Summary Questions**

1. Copy and complete using the words below:

   discovered gaps mass periodic properties

   The chemical elements can be arranged in a ______ table. Within the table, elements with similar ______ are placed together. Like other chemists, Mendeleev listed elements in order of ______, but he realized that he needed to leave ______ for elements that had not yet been ______.

2. Mendeleev has an element named after him. What is it?

3. Where do we find the most reactive elements in the periodic table?

**DID YOU KNOW?**

- Metals react by losing electrons. Non-metals react with metals by gaining electrons.
- The alkali metal caesium reacts explosively with cold water, and reacts with ice at temperatures above –116°C.

**Figure 1** The modern periodic table. The upper number on the left of a symbol is the element's atomic mass (the number of protons and neutrons in its nucleus). The lower number is its atomic number (or proton number) — the number of protons in the nucleus.

The periodic table of the elements developed as an attempt to classify the elements. It arranges them in a pattern according to their properties.

Early versions of the periodic table failed to take account of the fact that not all of the elements were known at that time.

Mendeleev’s table took account of unknown elements, and so provided the basis for the modern periodic table.

The group that an element is in is determined by its atomic (proton) number.

The number of electrons in the highest energy level of an atom determines its chemical properties.

We can explain trends in reactivity as we go down a group in terms of the number of energy levels in the atoms.