"EVALUATE" 6 MARK QUESTIONS

C2 The Periodic Table

Developing a technique to answer an evaluate question

- Step 1 – **read** the information supplied

- In the 1860s scientists were trying to organise elements. **Figure 2** shows the table published by John Newlands in 1865. The elements are arranged in order of their atomic weights. **Figure 3** shows the periodic table published by Dmitri Mendeleev in 1869. Mendeleev's table became accepted by other scientists whereas Newlands' table was not.
- Evaluate Newlands' and Mendeleev's tables.
- You should include:
  - a comparison of the tables
  - reasons why Mendeleev's table was more acceptable.
- Use **Figure 2** and **Figure 3** and your own knowledge.

H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Cr	Ti	Mn	Fe
Co.Ni	Cu	Zn	Y	In	As	Se
Br	Rb	Sr	Ce.La	Zr	Di.Mo	Ro.Ru
Pd	Ag	Cd	U	Sn	Sb	Te

Figure 2

H							
Li	Be	B	C	N	O	F	
Na	Mg	Al	Si	P	S	Cl	
K Cu	Ca Zn	? ?	Ti ?	V As	Cr Se	Mn Br	Fe Co Ni
Rb Ag	Sr Cd	Y In	Zr Sn	Nb Sb	Mo Te	? I	Ru Rh Pd

Figure 3

Developing a technique to answer an evaluate question

- Step 2 – **plan** your answer
- Plan your answer by copying the following boxes down and filling them in. Remember to include your own knowledge and not just the information given.

List of things that are similar on each figure	List of things that are different between them

- Then make notes of any other relevant information you can apply here.

H	Li	Be	B	C	N	O
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Na	Mg	Al	Si	P	S	Cl	
K Cu	Ca Zn	? ?	Ti ?	V As	Cr Se	Mn Br	Fe Co Ni
Rb Ag	Sr Cd	Y In	Zr Sn	Nb Sb	Mo Te	? I	Ru Rh Pd

Figure 3

Developing a technique to answer an evaluate question

- Step 3 – **develop** your conclusion
- Why is Mendeleev's periodic table better?
- Based on your notes and additional scientific-valid reasons, write a summary that concludes this.
- Step 3 – **answer** the question
- Use Point-Evidence-Explain in your writing to support your conclusion.

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Figure 2

H							
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Na	Mg	Al	Si	P	S	Cl	
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Rb Ag	Sr Cd	Y In	Zr Sn	Nb Sb	Mo Te	? I	Ru Rh Pd

Figure 3

Example answer:

- FROM THE FIGURES ABOVE, IT IS SEEN THAT BOTH SCIENTISTS ORDERED THE ELEMENTS BY INCREASING ATOMIC WEIGHT AND THAT THERE ARE SOME SIMILARITIES IN GROUPING THE ELEMENTS E.G. SOME OF THE HALOGENS. IT IS ALSO SHOWN IN SOME INSTANCES THAT THERE IS MORE THAN ONE ELEMENT IN EACH BOX.
- THE REASON WHY MENDELEEV'S MODEL WAS MORE WIDELY ACCEPTED IS BECAUSE HE CHANGED SOME OF THE ORDERS OF ELEMENTS TO FIT THE CHEMICAL REACTIVITY RATHER THAN MASS E.G. TELLIRIUM AND IODINE. HE ALSO LEFT GAPS FOR UNDISCOVERED ELEMENTS WHICH WERE LATER FILLED BY NEW ELEMENTS WHICH FIT THE EXPECTED PROPERTIES.

Answer Mark Scheme

- **Level 3 (5-6 marks):**
- A judgement, strongly linked and logically supported by a sufficient range of correct reasons, is given.
- **Level 2 (3-4 marks):**
- Some logically linked reasons are given. There may also be a simple judgement.
- **Level 1 (1-2 marks):**
- Relevant points are made. They are not logically linked.
- **Level 0**
- No relevant content

Indicative content
comparative points

- both tables have more than one element in a box
- both have similar elements in the same column
- both are missing the noble gases
- both arranged elements in order of atomic weight

advantages of Mendeleev / disadvantages of Newlands

- Newlands did not leave gaps for undiscovered elements
- Newlands had many more dissimilar elements in a column
- Mendeleev left gaps for undiscovered elements
- Mendeleev changed the order of some elements (e.g. Te and I)

points which led to the acceptance of Mendeleev's table

- Mendeleev predicted properties of missing elements
- elements with properties predicted by Mendeleev were discovered
- Mendeleev's predictions turned out to be correct
- elements were discovered which fitted the gaps