Mendeleev

KS3 Chemistry · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

How did Mendeleev arrange the elements in 1869?

Step 1 · Order

Mostly in order of increasing atomic weight (mass).

Step 2 · Columns

He put elements with similar properties into the same group.

Step 3 · Gaps

He left gaps where no known element fitted the pattern.

Answer: By atomic weight, grouped by similar properties, with gaps

Check: Gaps were his boldest idea.

2. Now try one with the steps

Why did Mendeleev swap the order of tellurium (atomic weight 128) and iodine (127)?

Step 1 · By weight

Step 2 · By properties

Step 3 · Decision

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Which Russian chemist published a periodic table in 1869? [1]

2. In what order did Mendeleev mostly arrange the elements? [1]

3. About how many elements were known in 1869: 23, 63 or 118? [1]

4. Why did Mendeleev leave gaps in his table? [2]

5. Name an element discovered after Mendeleev predicted it. [1]

6. Which whole group was missing from Mendeleev's 1869 table? [1]

7. What is used to order the modern periodic table? [1]

8. Silicon has atomic weight 28 and tin 119. What is the average, the simple prediction for eka-silicon? [1]

9. Gallium was predicted to have a density of about 6.0 g/cm^3. It was measured as 5.9 g/cm^3. What is the difference, in g/cm^3? [1]

10. Why was it important that Mendeleev's predictions could be tested? [2]

11. Why did Mendeleev put iodine after tellurium even though iodine is lighter? [2]

12. Explain why the noble gases were discovered later than most other elements. [2]

13. Give ONE way the modern table is different from Mendeleev's. [1]

14. Other scientists (such Newlands) had tried to arrange elements before Mendeleev. Suggest why Mendeleev's version was more successful. [2]

4. Before you hand it in

"Mendeleev discovered all the elements."
Mendeleev arranged the 63 known elements and predicted others; other chemists discovered them.

"The gaps were mistakes."
He left gaps for undiscovered elements so the groups stayed correct.

"The modern table is ordered by atomic mass."
Today's table is ordered by atomic number.

Thinking a model is wrong if it gets updated.
Good models are improved when new evidence appears.