

Revising the Periodic Table

Target level

This exercise is intended for students in the 14–16 year old age range, who have studied the Periodic Table. It may also be useful as a way of testing prior knowledge for students on post-16 courses.

Topic

The Periodic Table.

Rationale

The Periodic Table is one of the central organising themes in chemistry, and one of the areas where ideas about the macroscopic (*ie* properties of elements) and molecular (*eg* electronic configuration) properties are related (and often confused) – see Chapter 6 of the Teachers' notes.

This exercise is based on concept mapping - an important method for exploring students ideas, and a useful study and revision technique. (No prior experience of concept mapping is needed to undertake the exercise.) The exercise provides a concept map for the Periodic Table, with links labelled with numbers. The students are asked to supply (30) sentences to match the links. The exercise can be set as an individual task to elicit student knowledge, or as a group task to encourage discussion of ideas. Concept mapping is discussed in Chapter 3 of the Teachers' notes.

During piloting, it was felt that the exercise was thought provoking for students, and required them to think about concise definitions of terms. Some students reacted positively to the activity, although some found it boring. (See the comments about different activities appealing to students with different learning styles in Chapter 3 of the Teachers' notes.) The exercise was found to reveal areas where students were confused by what is meant by 'substance' in chemistry for example - see Chapter 6 of the Teachers' notes).

Instructions

Each student requires a copy of the worksheets **Revision map for the Periodic Table** and **The Periodic Table** – a sheet for student responses.

Teachers may wish to encourage some students to add new concepts and links to the map as an extension activity.

Resources

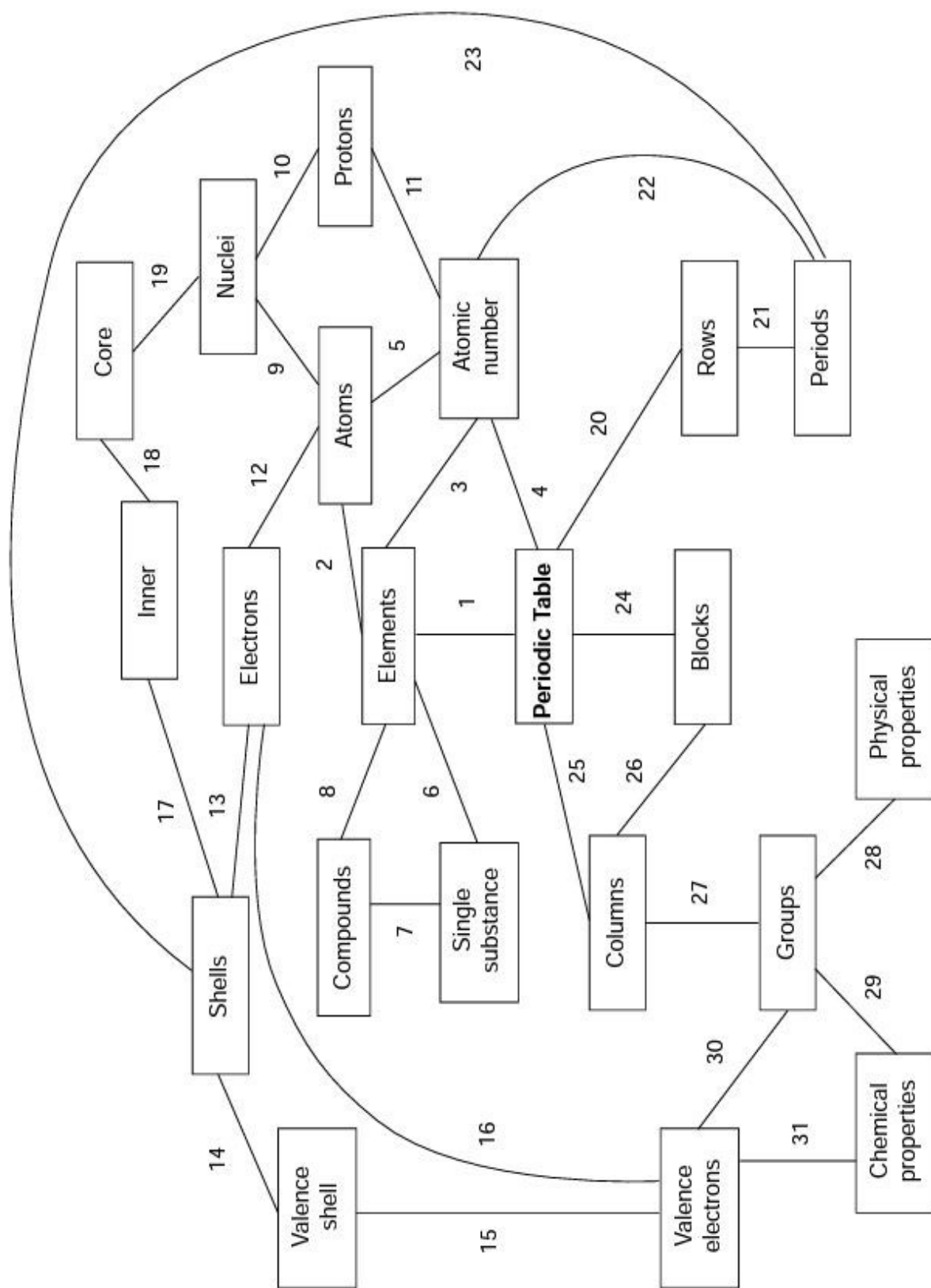
Teachers who use the term 'outer shell electrons' rather than 'valence electrons' may wish to modify the worksheets.

- _ Student worksheets
- Revision map for the Periodic Table
- The Periodic Table
- Revision summary of the Periodic Table

Feedback for students

A sample answer sheet for students (**Revision summary for the Periodic Table**) is provided. Teachers may wish to issue this when students have undertaken the exercise. Where students in the group have made creditable suggestions for additional concepts/links, then the teacher may wish to have students in the group add these to the answer sheet.

Revision map for the Periodic Table

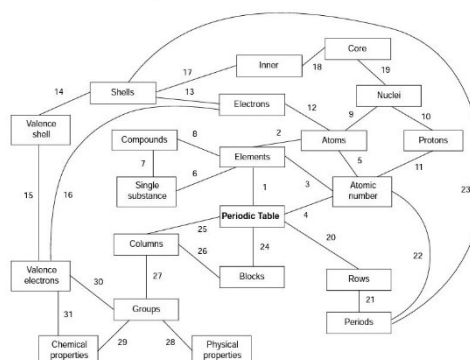


The Periodic Table

You have been given a copy of a revision 'map' for the topic of the Periodic Table. The map is a diagram with boxes labelled with some words we use in chemistry, joined by numbered lines. Each of the lines suggests a relationship, which could be described in a sentence.

You are asked to think up sentences to show how the different words in the boxes are related. Try and be as accurate and precise as you can. Make sure you put each sentence next to the correct number in the spaces below.

Revision map for the Periodic Table



One of the sentences has been suggested for you, to get you started.

Fill in as many of the spaces as you can, **but do not worry** if you cannot complete them all.

1.
2.
3.
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6. An element is a single chemical substance.
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31.

Revision summary for the Periodic Table

Some suggested sentences linking the words in the diagram.

1. The Periodic Table is a way of arranging what we know about the chemical elements.
2. Each element in the Periodic Table is a different type of atom.
3. Each element has a different atomic number.
4. The Periodic Table is arranged in atomic number order.
5. Each atom has an atomic number.
6. An element is a single chemical substance.
7. A compound is a single chemical substance.
8. Compounds are formed when two or more chemical elements react together.
9. An atom has a central nucleus.
10. A nucleus contains one or more protons.
11. The number of protons in the atomic nucleus gives the atomic number.
12. An atom contains one or more electrons.
13. The electrons are arranged in shells.
14. The outermost shell is called the valence shell.
15. Electrons in the valence shell are called valence electrons.
16. Each atom has one or more valence electrons.
17. Most atoms have one or more inner shells of electrons inside the valence shell.
18. The inner shells are part of the atomic core.
19. The nucleus is part of the atomic core.
20. The elements are arranged in rows in the Periodic Table.
21. The rows of elements are called periods.
22. The higher the atomic number of an element, the higher the period.
23. The number of shells of electrons determines the period an element is in.
24. The Periodic Table is arranged in several blocks.
25. The elements are arranged in columns in the Periodic Table.
26. Each block of the Periodic Table contains several columns that are next to each other.
27. The columns of elements are called groups.
28. Physical properties of elements often change in a pattern down the group.
29. Groups of elements usually have similar chemical properties.
30. Elements in a group have the same number of outer valence electrons.
31. An element's chemical properties are related to the number of outer valence electrons in its atoms.