Chemistry	**Lesson 12: Building the periodic table**	
Curriculum Key:	Appears in all additional GCSE schemes	Edexcel Topic 5

Objective(s)	**Resources needed:**
1. Understand how the study of the properties of the elements led to the construction of the periodic table. 2. Appreciate the history of how scientists discovered elements by following predictions based on the periodic table. .	PowerPoint/data projector properties cards orbital cards blank periodic tables named element cards
Starter: *15 minutes* PowerPoint (slides 1 – 7) to introduce the periodic table and card sort challenge. Less able groups should be told that there are 8 groups (6 x3 and 2 x 4). If necessary revise the concepts of density, melting and boiling points.	**Teacher input/assessment** Point out the various properties listed and suggest how they can help to group the cards.
Main Activity 1: *15 minutes* Using the property cards, sort into 8 groups (the transition metals are not included – to simplify the task). More able should be guided to set out groups in order of reactivity.	**Teacher input / assessment** Assist with prompts where necessary.
Main Activity 2: *20 minutes* Leave slide 8 of PowerPoint on screen. Order orbital cards into 8 groups Transition metals cards (labelled with double letters) are available for very high ability groups. With guidance, match properties cards to electron orbitals.	**Teacher input / assessment** Explain how to group cards according to number of electrons in outer orbital (columns) and then to arrange each column by number of orbitals.
Plenary: *10 minutes* Slides 9 and 10 show the Periodic Table. Use information about elements' names, symbols and number of electrons to complete the periodic table blank. Complete for homework. Students could colour in the different periodic groups.	**Teacher input / assessment** Start groups off. A strong hint would be to let them know the number of electrons permitted in each orbital.

Learning Outcomes:

All students must: be able to explain that the columns of the periodic table contain elements with similar properties

Most students should: as above, plus understand and explain that these properties are due to the arrangement of the electrons

Some students could: as above plus predict the properties and reactivity of elements based on their electron configuration.

Key Skills: recognising patterns and making links. **Key words:** element, property, reaction, density, electron orbital. **Homework:** complete a simple periodic table based on classwork knowledge.	**Differentiation**: **More able:** use property cards to create both groups (columns) and order of reactivity. Later to recognise this is due to electron configuration. **Less able:** with teacher input will see a pattern emerging.