

# Topic: Metals

Prepared by: Jeff Sturgess and Narinder Kaur

## Issues tackled:

1. Models and analogies - Displacement reactions.
2. Investigative Skills - Factors which lead to rusting (corroding) of iron.
3. Differentiation and SEN - Helping less able pupils to understand reactions with metals.

## Issue 1: Models and analogies - Displacement reactions

### Prior knowledge and experience:

### Possible tasks:

#### Preparation for tutorial:

1. Prepare a model to explain the theory of displacement reactions.
2. Think of an appropriate analogy for displacement reactions and plan how to use it with a class.
3. Prepare a visual task to practise formation of word equations e.g. flashcards, cut and stick worksheets or interactive whiteboard activities.

#### Possible activities during tutorial:

- 1, 2 and 3. Present model, analogy or task prepared. Discuss how these ideas will help trainees to understand and consider possible improvements.

### AST Input:

- Raise awareness to possible misconceptions that might lead from the models and analogies discussed.
- Look at existing resources about word equations and discuss how they may be extended or adapted for balanced, symbol equations.

### Reading: Subject knowledge and understanding

Ryan, Johnson, Adamson and Williams, (2004) **Spotlight Science Pupil's Book 8**, Nelson Thornes, Cheltenham, pages 38-39.

#### Subject pedagogy

Jones, M. Jones, G. Marchington, P. and Acaster, D. (1998) **Balanced Science**, Cambridge University Press, Cambridge, pages 452-453.

Ryan, L. (2005) **Chemistry for You**, Nelson Thornes, Cheltenham, pages 80-83.

#### Useful websites and applications

<http://www.sycd.co.uk> follow links to resource contents, chemistry, chem wars. To look at a computer model/game about displacement reactions.

### Resources: Task 3

Computer and interactive whiteboard.

## Issue 2: Investigative Skills - Factors which lead to rusting (corroding) of iron

### Prior knowledge and experience:

### Possible tasks:

#### Preparation for tutorial:

1. Look at the available resources for this investigation, try out an experiment and write a risk assessment.
2. Construct a suitable writing frame which will guide all pupils to plan a successful enquiry.

#### Possible activities during tutorial:

1. Demonstrate the practical, pointing out health and safety issues.
2. Show writing frame and discuss the key factors that need to be taken into account when collecting evidence.

### AST Input:

- Lead a discussion on the possible problems of the experiment and strategies to consider results which are “wrong”.

### Reading: Subject knowledge and understanding

Ryan, Johnson, Adamson and Williams, (2004) **Spotlight Science Pupil’s Book 8**, Nelson Thornes, Cheltenham, pages 120-121.

**Starting Science 3**, Oxford University Press, Oxford. page 50.

**Science book 2**, Folens, Bedfordshire pages 86-87.

#### Subject pedagogy

Ryan, L. (2005) **Chemistry for You**, Nelson Thornes, Cheltenham pages 92-93.

#### Useful websites and applications

KS3 Bitesize Revision: (in the Key Stage 3 chemistry – reactions section)  
[www.bbc.co.uk/schools/ks3bitesize/science/chemistry/reactions\\_5.shtml](http://www.bbc.co.uk/schools/ks3bitesize/science/chemistry/reactions_5.shtml)

### Resources: Task 1

Hazcards for Risk Assessment.

Access to practical equipment as necessary.

Equipment list for technicians: 4 test tubes, 4 small iron nails, test tube rack, anhydrous calcium chloride/silica gel, cotton wool/bung, paraffin/oil, tap water and boiled water.

### Issue 3: Differentiation and SEN – Helping less able pupils to understand reactions with metals.

Prior knowledge and experience:

Possible tasks:

**Preparation for tutorial:**

1. Print out and trial the microscale chemistry resource listed in useful websites and applications, consider if it would be helpful for some or all of your class.
2. Talk to learning assistants or the school/departmental SENCO about the needs of pupils in your class and the difficulties they may have in understanding reactions.
3. Adapt or design a resource (e.g. homework sheet or plenary) for less able pupils to use to strengthen or assess their understanding of reactions with metals.

**Possible activities during tutorial:**

1. Demonstrate one of the microscale experiments. Discuss whether this resource offers an easier route to understanding the reactivity series.
2. Discuss the needs of different pupils and consider strategies to help them understand the abstract ideas of reactions and reactivity series.
3. Critically evaluate existing resources in the light of your class and discuss the resource presented.

AST Input:

- Show some of the difficulties that less able pupils have in making the leap from observation to results table or from results table to conclusion in the reactions with metals experiments. Discuss strategies to overcome these difficulties.

Reading: Subject knowledge and understanding

Subject pedagogy

Useful websites and applications

[www.ase.org.uk/sen/](http://www.ase.org.uk/sen/) Follow links to investigations and projects, then microscale chemistry.

Resources: **Task 1**

[www.ase.org.uk/sen/](http://www.ase.org.uk/sen/) Follow links to investigations and projects, then microscale chemistry, choose an appropriate experiment.

**Task 2**

Departmental resources/homework sheets.