

Meaningful Learning Experiences

Strategic Commitment	✓	Part of a regional, ESF-funded 'Careers Local' programme
Curriculum Provision	✓	Contributing to a reworking on the KS3 curriculum
Employer Partnerships	✓	Involving a local manufacturer and Enterprise Adviser
Reflective Young People	✓	Self-assessing impact by the whole year group
Informed Career Choices	✓	Increased awareness about roles in manufacturing

Year 7 apply learning about Oxidation to help promote local iron casting company

Brookfield Community School in Chesterfield had chosen six curriculum areas to create exemplar projects as part of a strategic plan to enrich subject learning in partnership with local employers. The Science faculty was reworking its Key Stage 3 programmes of study and was open to ideas about engaging students in virtually any part of the wide range of curriculum content.

The curriculum topic of 'Understanding Oxidation Reactions' requires students to recall examples of oxidation reactions, describe oxidation using word equations and particle diagrams and to investigate changes caused by oxidation.

The school's Enterprise Adviser is a senior manager at United Cast Bar, which is a world leader in continuous cast iron bar and is located a mile down the road, near the town centre. Students were shown a dramatic video illustrating the processes involved in melting and casting iron bars, but they also learned about different surface treatments used by the company to reduce oxidation.

Students were challenged to, '*... come up with a two minute boardroom presentation that explains how iron oxidises and how treatments can reduce this process and allow our bars to be used in extreme situations*'. Students presenting the best work were invited for a VIP visit and lunch at the factory, where they would also pitch their ideas in the boardroom.

Benefits for the Students

- *'I managed to get my point across that I wanted to get across'*
- *'I felt a bit nervous ... because it's someone important ... from a massive company'*
- *'It's a big difference ... you don't see an employer every day, so it's a pretty big challenge'*
- *'It shows how you can prevent [oxidation] and how they do it for their iron bars'*
- *'It helps you think there are lots of other jobs'*
- *'I'd like to know how long it's taken them to find the best method of stopping [oxidation]'*
- (Data from self-assessment responses)

Benefits for the School

- *'The process of oxidation is one of the things students have to look at, so we thought this was an ideal time to get them linked in to a local industry'*
- *'It's being able to see that this thing that we're doing on the desk or in the lab has a bigger application ... It has come home to them that this is not just something we do in school'*
- *'{United Cast Bar} is somewhere the majority didn't know existed. Knowing it's a local thing really piqued their interest ... Some of the groups have gone into a great deal of detail'*

Benefits for the Employer

- *'They came over with some good answers ... facts and figures about oxidation, even down to chemical formulae ... It was difficult to pick one because they were all winners'*
- *'I think it's brilliant. We like to work with young people and local schools. It makes us look to the future – to the people we're bringing into the company'*
- *'It was no hard work at all. It was more enjoyable than work. I had nothing to do – just come down and see everybody and give a quick speech. It was a great day'*

Chapter 6: Reactions

1.6.4 Understanding oxidation reactions

Lesson overview

Learning objectives

- Recall examples of oxidation reactions.
- Describe oxidation using word equations and particle diagrams.
- Investigate changes caused by oxidation.

Learning outcomes

- Describe evidence of oxidation reactions. [O1]
- Explain why oxidation is a chemical reaction. [O2]
- Use a simple model/word equation to explain changes during oxidation reactions. [O3]

Skills development

- Working scientifically: 2.1 Analyse path
- Developing numeracy: record and plot
- Developing literacy: summarise key ideas

Resources needed photos of visible effects, stands, bosses and clamps, two 100 cm³ thick rubber tubing for the connections, ml the practical, per group (see Technician's 1.6.4b; Technician's notes 1.6.4)

Common misconceptions Oxidation only

Key vocabulary oxidation

Teaching and learning

Engage

- Show the students a series of photos of browning apple, tarnished silver, burnt are having difficulty, give them a clue b the same substance (oxygen). Ask 'W'

Challenge and develop

- Introduce oxidation as a chemical reac
- The students should carry out an exper
- Encourage them to explain precautions using lings to hold the copper, wearing cooling, they should open out the copp black and the inside remains shiny). [C]
- Ask the students to compare the heat earlier lesson: copper remains the same magnesium reacts much more quickly/ powder/fash. [O1, O2]
- Discuss how the results provide evidee lusion/properties: a new substance is think the black colour is soot and that

Key Stage 3 Science Teacher Pack 1



The UCB Oxidation Challenge

It would help to be able to reassure customers that we can deal with oxidation of our bars without the need to look through a long technical document. It is particularly important when working in other countries.




'Understanding Oxidation Reactions' is part of the Key Stage 3 Science curriculum. Year 7 students were challenged to apply their knowledge about this topic to communicate how a local manufacturer uses different coating reduce oxidation of their cast bar products. The best presentations were selected by students in class before being presented at a year group assembly to the employer, who invited the students for a VIP visit and to pitch their ideas in the boardroom.