Week 5 Lesson 1

The Bombardier beetle

Aim: Explore an aspect of chemistry found in an organism which is being researched by scientists.

Keywords: catalyst, chemical reaction, evolution, exothermic

Starter activity

1. Scientist — who's who?

Match the scientist with their areas of research and other achievements.

Main activities

1. Charles Darwin and the Bombardier beetle

The following activities are on the PowerPoint 'The Bombardier Beetle':

- The story of Charles Darwin's encounter with a Bombardier beetle
- Sequence the possible stages of evolution of the Bombardier beetle's defence mechanism
- Practical – exothermic reaction.

Plenary activity

1. Haiku

Students sum up the lesson or part of the lesson by writing a three line Haiku.

The first line should have 5 syllables, the second 7 and the third 5. Subjects could be Darwin, bombardier beetle, exothermic reactions, catalysts.

E.g. *Charlie learnt one truth*

when out hunting for beetles.

Bug in mouth - no fun!

Differentiation

Students who need support could be given a selection of words with syllables counted or marked by dots.

Week 5 homework activity

This task is in preparation for lessons next week on artificial photosynthesis. Students are asked to produce a PowerPoint which will be shown in the lesson next week. Assign each student a task or ask them to choose one. Tell them that the PowerPoints that they create will be shown in class the following week.

- Design a PowerPoint presentation which shows the substances that are involved in photosynthesis. Use a maximum of six slides.
- Design a PowerPoint presentation which describes the process of photosynthesis. You are allowed to use mathematical symbols, three words only and a maximum of three slides.
- Design a PowerPoint presentation which explains photosynthesis cryptically. Think of clues which Sherlock Holmes might decipher to give each part of the process. Use a maximum of six slides.

Starter 1

Who's who? — Teaching notes and answers

This is a tiny snapshot of scientists that students may have heard of, both historical and contemporary. For further information about inspirational scientists see the following links:

- For influential women scientists both historical and contemporary see this article from *The Independent*: www.independent.co.uk/news/science/women-in-science-pioneers-blaze-path-for-others-1924794.html
- *The Life Scientific* programme from Radio 4 has lots of interviews with current scientists: www.bbc.co.uk/programmes/b015sqc7
- The Royal Society webpage *Inspiring Scientists: Diversity in British Science*, records the life stories of 10 British scientists with minority ethnic heritage: royalsociety.org/policy/projects/leading-way-diversity/inspiring-scientists/
- The Royal Society of Chemistry has a series of short videos which ask inspirational scientists working in chemistry what motivated them to study chemistry: www.rsc.org/learn-chemistry/collections/faces-of-chemistry/inspirational-chemists

Caroline Herschel born 1750 died 1848	Astronomy – discovered 8 comets and catalogued star clusters The first female scientist to be paid a salary
Stephen Hawking born 1942	Cosmology and theoretical physics, author of *A brief history of time*
Dr Maggie Aderin-Pocock, MBE born 1968	Space science, optical instrumentation Presenter of the *The Sky at Night*, MBE awarded 2009
Baroness Susan Greenfield, CBE born 1950	Professor of Synaptic Pharmacology at Oxford University Member of the House of lords
Rosalind Franklin born 1920 died 1958	X-ray crystallography, important contribution to understanding of DNA structure in the 1950s.
Brian Cox, OBE born 1968	Professor of Particle Physics at University of Manchester Writer, TV presenter and keyboard player for 80s pop group D:Ream
Alice Roberts born 1973	Clinical anatomist and Professor of Public Engagement in Science at the University of Birmingham Writer and TV presenter.
Peter Higgs born 1929	Proposed the existence of a particle called Higgs boson; Nobel prize in Physics 2013
Dorothy Hodgkin born 1910 died 1994	Biochemistry and protein crystallography – discovered the structure of penicillin and vitamin B12: Nobel Prize for Chemistry 1964
Isaac Newton born 1643 died 1727	Physics and mathematics, discovered laws of gravity and motion

Who's who?

Use the information to match the scientist to their area of research and achievements.

Scientist	Areas of research and some achievements
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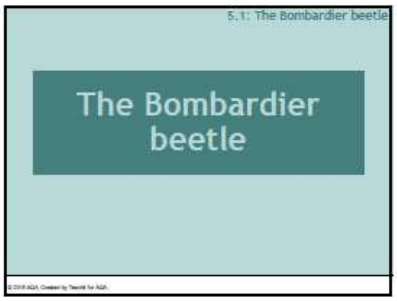
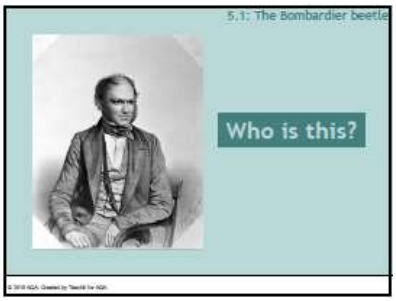
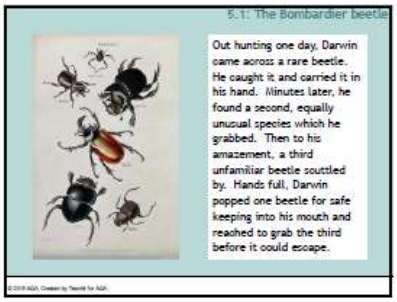
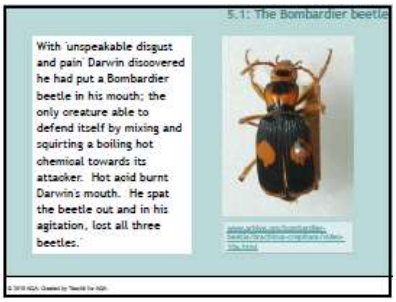
Main 2

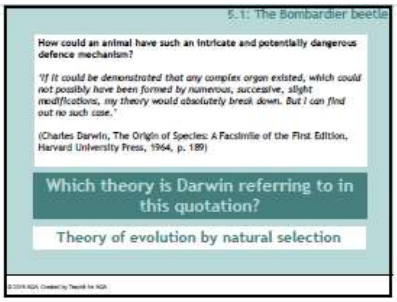
The Bombardier beetle – PowerPoint

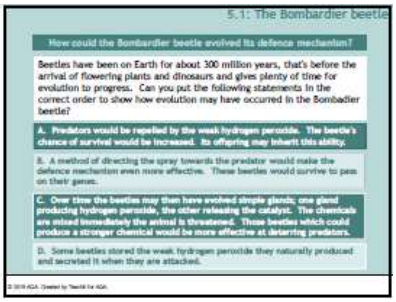


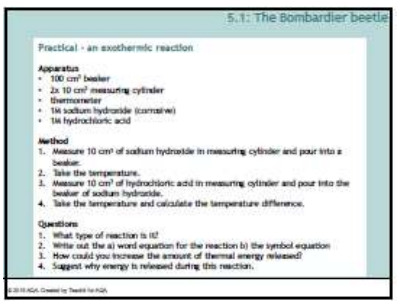


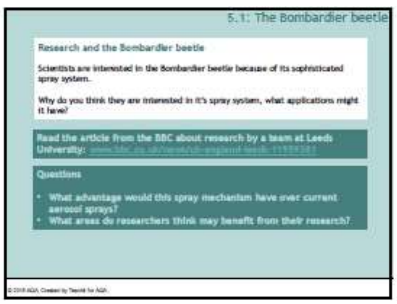












Week 5 homework

Preparation for photosynthesis

Choose one of the following tasks

- Design a PowerPoint presentation which shows the substances that are involved in photosynthesis. Use a maximum of six slides.
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