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](http://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](http://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/](https://royalsociety.org/policy/projects/leading-way-diversity/inspiring-scientists/)

|  |  |
| --- | --- |
| Caroline Herschelborn 1750 died 1848 | Astronomy – discovered 8 comets and catalogued star clustersThe first female scientist to be paid a salary |
| Stephen Hawkingborn 1942 | Cosmology and theoretical physics, author of *A brief history of time* |
| Dr Maggie Aderin-Pocock, MBEborn 1968 | Space science, optical instrumentationPresenter of the *The Sky at Night*, MBE awarded 2009 |
| Baroness Susan Greenfield, CBEborn 1950 | Professor of Synaptic Pharmacology at Oxford UniversityMember of the House of lords |
| Rosalind Franklinborn 1920 died 1958 | X-ray crystallography, important contribution to understanding of DNA structure in the 1950s. |
| Brian Cox, OBEborn 1968 | Professor of Particle Physics at University of ManchesterWriter, TV presenter and keyboard player for 80s pop group D:Ream |
| Alice Robertsborn 1973 | Clinical anatomist and Professor of Public Engagement in Science at the University of BirminghamWriter and TV presenter.  |
| Peter Higgsborn 1929 | Proposed the existence of a particle called Higgs boson; Nobel prize in Physics 2013 |
| Dorothy Hodgkinborn 1910 died 1994 | Biochemistry and protein crystallography – discovered the structure of penicillin and vitamin B12: Nobel Prize for Chemistry 1964 |
| Isaac Newtonborn 1643 died 1727 | Physics and mathematics, discovered laws of gravity and motion |

* 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](http://www.rsc.org/learn-chemistry/collections/faces-of-chemistry/inspirational-chemists)

Who’s who?

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

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

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.
* 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.

 ✂

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.
* 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.