# Nuclear decay equations: Teacher solutions

***Education in Chemistry***March 2018[rsc.li/EiC218-thehuntison](http://rsc.li/EiC218-thehuntison)

**Differentiated worksheets, ages 14–16, 16+**

**This activity accompanies the above article ‘The hunt is on’.**

**Nuclear decay equations 1**

1. Complete the nuclear equations for a decay of the following isotopes by adding in the products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$$$ |  | $$$$ | **+** | $$$$ |
| $$$$ |  | $$$$ | **+** | $$$$ |
| $$$$ |  | $$$$ | **+** | $$$$ |
| $$$$ |  | $$$$ | **+** | $$$$ |
| $$$$ |  | $$$$ | **+** | $$$$ |

1. Complete the nuclear equations for β decay of the following isotopes by adding in the products

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| $$$$ |  | $$$$ | **+** | $$$$ |
| $$$$ |  | $$$$ | **+** | $$$$ |
| $$$$ |  | $$$$ | **+** | $$$$ |
| $$$$ |  | $$$$ | **+** | $$$$ |
| $$$$ |  | $$$$ | **+** | $$$$ |

1. Complete the nuclear equations by adding in the isotope that decays and the type of decay

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of decay |  |  |  |  |  |
| β | $$$$ |  | $$$$ | + | $$$$ |
| α | $$$$ |  | $$$$ | + | $$$$ |
| α | $$$$ |  | $$$$ | + | $$$$ |

**Nuclear decay equations 2**

Complete the nuclear decay equations by adding in the products formed.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Type of decay** |  |  |  |  |  |
| **1** | β | $$$$ |  | $$$$ | **+** | $$$$ |
| **2** | α | $$$$ |  | $$$$ | **+** | $$$$ |
| **3** | α | $$$$ |  | $$$$ | **+** | $$$$ |
| **4** | β | $$$$ |  | $$$$ | **+** | $$$$ |
| **5** | α | $$$$ |  | $$$$ | **+** | $$$$ |
| **6** | β | $$$$ |  | $$$$ | **+** | $$$$ |
| **7** | β | $$$$ |  | $$$$ | **+** | $$$$ |
| **8** | α | $$$$ |  | $$$$ | **+** | $$$$ |
| **9** | β | $$$$ |  | $$$$ | **+** | $$$$ |
| **10** | β | $$$$ |  | $$$$ | **+** | $$$$ |
| **11** | α | $$$$ |  | $$$$ | **+** | $$$$ |
| **12** | α | $$$$ |  | $$$$ | **+** | $$$$ |
| **13** | β | $$$$ |  | $$$$ | **+** | $$$$ |
| **14** | α | $$$$ |  | $$$$ | **+** | $$$$ |
| **15** | α | $$$$ |  | $$$$ | **+** | $$$$ |

This can be graded out of 30 marks.

**Nuclear decay equations 3**

Complete the equations by adding in the type of decay, the isotope undergoing decay and/or the products. Each equation has one or more parts missing.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of decay** |  |  |  |  |  |
| **β** | $$$$ |  | $$$$ | + | $$$$ |
| **α** | $$$$ |  | $$$$ | + | $$$$ |
| α | $$$$ |  | $$$$ | + | $$$$ |
| **β** | $$$$ |  | $$$$ | + | $$$$ |
| α | $$$$ |  | $$$$ | **+** | $$$$ |
| **β** | $$$$ |  | $$$$ | + | $$$$ |
| β | $$$$ |  | $$$$ | + | $$$$ |
| α | $$$$ |  | $$$$ | + | $$$$ |
| **β** | $$$$ |  | $$$$ | + | $$$$ |
| β | $$$$ |  | $$$$ | **+** | $$$$ |
| **α** | $$$$ |  | $$$$ | + | $$$$ |
| α | $$$$ |  | $$$$ | + | $$$$ |
| β | $$$$ |  | $$$$ | **+** | $$$$ |
| α | $$$$ |  | $$$$ | **+** | $$$$ |
| α | $$$$ |  | $$$$ | + | $$$$ |

There are 25 missing pieces of information for pupils to fill in so this could be graded as a mark out of 25.