Balancing Decay Practice – Supplemental Worksheet  KEY
Balance the following nuclear reactions by putting in the missing nuclide or particle

\[ \frac{4}{2}He + \frac{14}{7}N \rightarrow \frac{17}{8}O + \ ? \]

1. \( ^{11}p \)

Total mass number is 28 (14+14), total charge number is 9 (2+7).
Missing on the right is mass number of 1 (28-27) and charge number of 1 (9-8).

\[ \frac{4}{2}He + \frac{9}{4}Be \rightarrow \ ? + \frac{1}{0}n \]

2. \( ^{12}_{6}C \)

Total mass number is 13 (4+9), total charge number is 6 (2+4).
Missing on the right is mass number of 12 (13-1) and charge number of 6 (6-0).

\[ \frac{235}{92}U + \frac{1}{0}n \rightarrow \frac{144}{56}Ba + \ ? + 3\frac{1}{0}n \]

3. \( ^{89}_{36}Kr \)

\[ \frac{2}{1}D + \frac{3}{1}T \rightarrow \ ? + \frac{1}{0}n \]

4. \( ^{4}_{2}He \)

\[ \ ? \rightarrow \frac{234}{90}Th + \frac{4}{2}He \]

5. \( ^{238}_{92}U \)

\[ \frac{124}{53}I \rightarrow \frac{0}{1}\beta + \ ? \]

6. \( ^{124}_{52}Te \)

\[ \frac{197}{79}Au + \frac{1}{0}n \rightarrow \ ? \]

7. \( ^{198}_{79}Au \)

\[ \frac{6}{3}Li + \ ? \rightarrow \frac{2}{4}He \]

8. \( ^{2}_{1}H \)
For the following predict the decay products

6. Alpha decay of Rn-222
\[ ^{222}_{86}\text{Rn} \rightarrow ^{218}_{84}\text{Po} + ^{4}_{2}\text{He} \]

Alpha decay produces and alpha particle \(^{4}_{2}\text{He}\). Lowering the mass number by 4 and the charge number by 2.

7. Beta minus decay of Pd-123
\[ ^{123}_{46}\text{Pd} \rightarrow ^{123}_{47}\text{Ag} + ^{0}_{-1}\text{e} \]

Beta(-) decay produces an electron. Lowering the mass number by 0 and increasing the charge number by 1.

8. Alpha decay of Cf-240
\[ ^{240}_{98}\text{Cf} \rightarrow ^{236}_{96}\text{Cm} + ^{4}_{2}\text{He} \]

9. Positron emission from C-11
\[ ^{11}_{6}\text{C} \rightarrow ^{11}_{5}\text{B} + ^{0}_{1}\text{e} \]

Positron emission produces a positron. Lowering the mass number by 0 and decreasing the charge number by 1.

10. Electron capture of Am-242
\[ ^{242}_{95}\text{Am} + ^{0}_{-1}\text{e} \rightarrow ^{242}_{94}\text{Pu} \]

Electron capture converts a proton to a neutron. Lowering the mass number by 0 and decreasing the charge number by 1.

11. Beta (-) decay of C-14
\[ ^{14}_{6}\text{C} \rightarrow ^{14}_{7}\text{N} + ^{0}_{-1}\text{e} \]

12. Beta(-) decay of Cs-137
\[ ^{137}_{55}\text{Cs} \rightarrow ^{137}_{56}\text{Ba} + ^{0}_{-1}\text{e} \]