Name: _____

Class: _____

ACTIVITY SHEET

3.4 Graphical analysis of radiation to determine half-life

A sample of an unknown radioactive material was analysed over a period of time every hour by measuring the level of radiation coming from the sample.

The results were recorded and are shown in the table on the right.

Time (hours)	Radiation (counts per second)
0	7932
1	5430
2	3720
3	2545
4	1740
5	1190
6	820
7	560
8	385
9	260
10	180
11	124
12	83
13	58
14	40

1 Plot these results as radiation intensity versus time on a set of axes that are labelled appropriately.

2 Connect the data points with a smooth curved line of best fit.

3 Select a point on the line that has a well-defined radiation count. Find the point on the line that has exactly half the level of radiation as the first point.

4 The difference in time between the two points found in step 3 corresponds to the half-life of the isotope. Repeat step 3 several more times using different starting points to find the average half-life.

5 Use your answer to step 5 to determine the identity of the radioisotope, which is commonly used as a radiopharmaceutical.

6 Comment on the validity of using this technique to identify an unknown radioisotope.