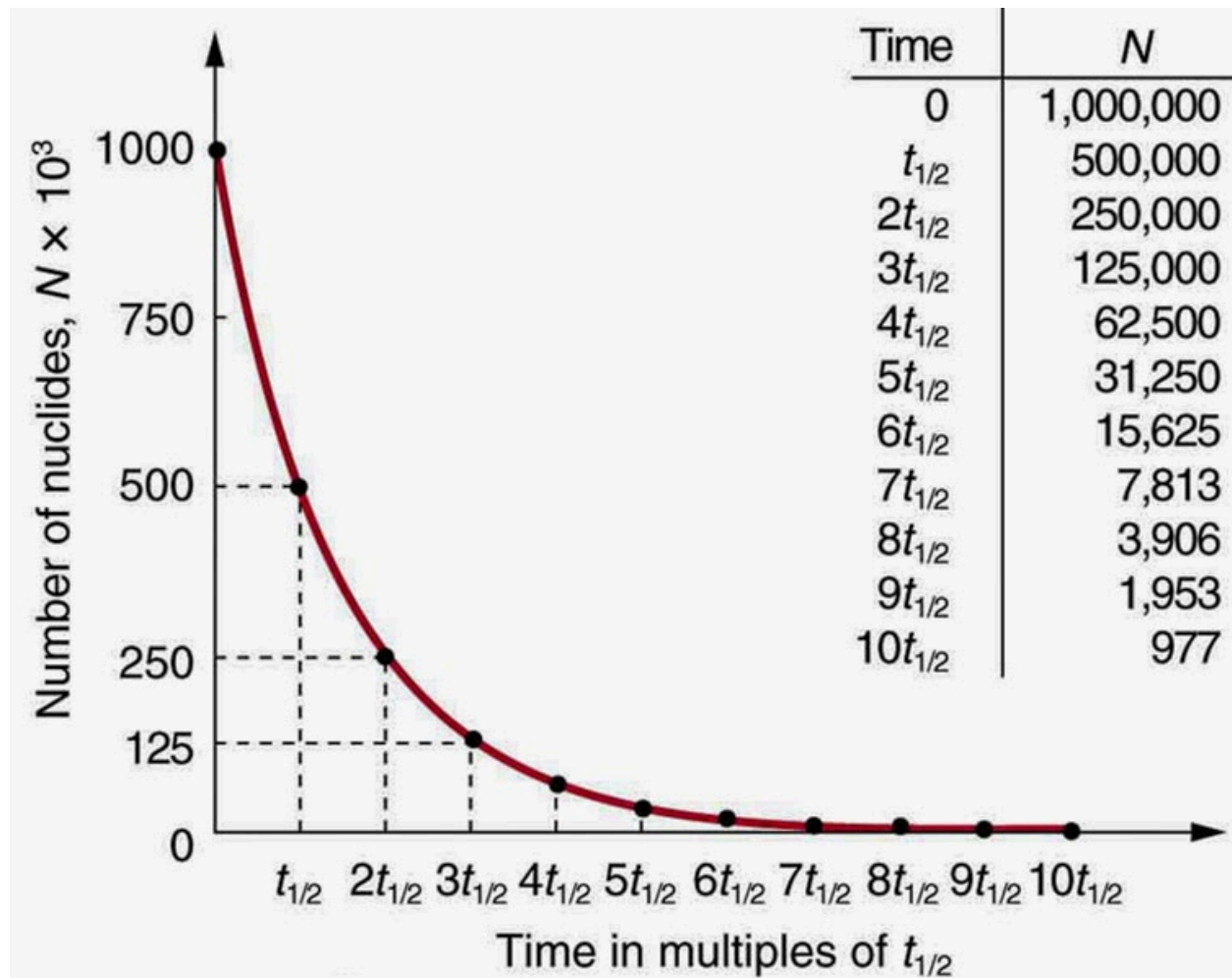Half-Life

The half life is the amount of time it takes for half of the nuclei in some radioactive matter to decay.

Radium has a half life of around 1600 (various values are quoted, from 1590 to 1620) years

- how long before Radium reduces to 25% of its nuclei?

Time	N
0	1,000,000
$t_{1/2}$	500,000
$2t_{1/2}$	250,000
$3t_{1/2}$	125,000
$4t_{1/2}$	62,500
$5t_{1/2}$	31,250
$6t_{1/2}$	15,625
$7t_{1/2}$	7,813
$8t_{1/2}$	3,906
$9t_{1/2}$	1,953
$10t_{1/2}$	977

Number of nuclides, $N \times 10^3$

Time in multiples of $t_{1/2}$

Protactinium 234 (a grandchild of Uranium) has a half life of 77 seconds

1)Produce a table showing the % of nuclei present every 10 minutes

A YouTube clip shows an experiment monitoring this decay:

       Every 10 seconds the count pauses.

       Then there is a 2.5 second delay until the next 10 second count starts, and so on.

The clip states that the background radiation count (to be subtracted) is 6 counts per 10 seconds

- students can plot an accurate graph of this experimental decay

Carbon 14 (used to carbon date ancient artifacts) has a half life of approximately 5700 years
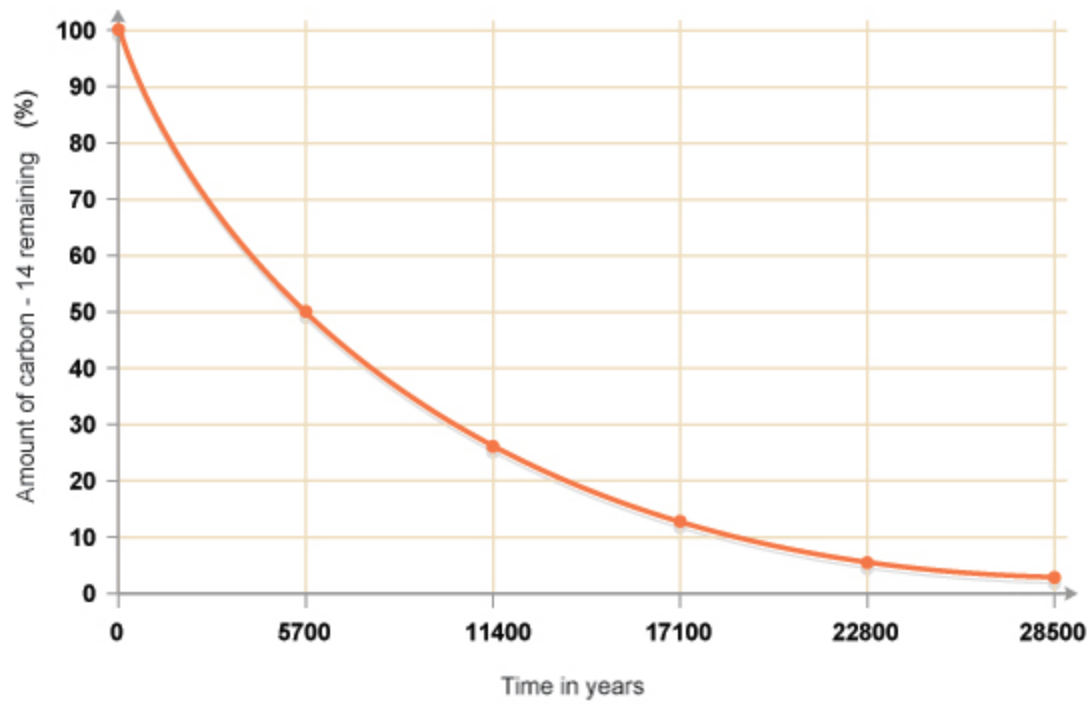
- What equation models the link between % and time?