

# Half-Life and Doubling Time

## Half-Life

Time it takes for the mass of something to get cut in half.

### Examples

1. The half-life of a radioactive element is 6 hours. How much of a 16 g sample remains after 24 hours?

$y = a \times 0.5^{t/h}$   
 $y = 16 \times 0.5^{24/6}$   
 $y = 16 \times 0.5^4$   
 $y = 1$  1g remains

2. The half-life of a radioactive element is 9 days. How much of a 150 g sample remains after 15 days?

$y = 150 \times 0.5^{15/9}$   
 $y = 150 \times 0.5^{1.67} \Rightarrow 47.1g$

## Doubling Time

Time it takes for the level of something to double.

### Examples

1. The doubling time of a bacterial strain is 3 hours. A strain starts with 4 cells. How many cells are present after 15 hours?

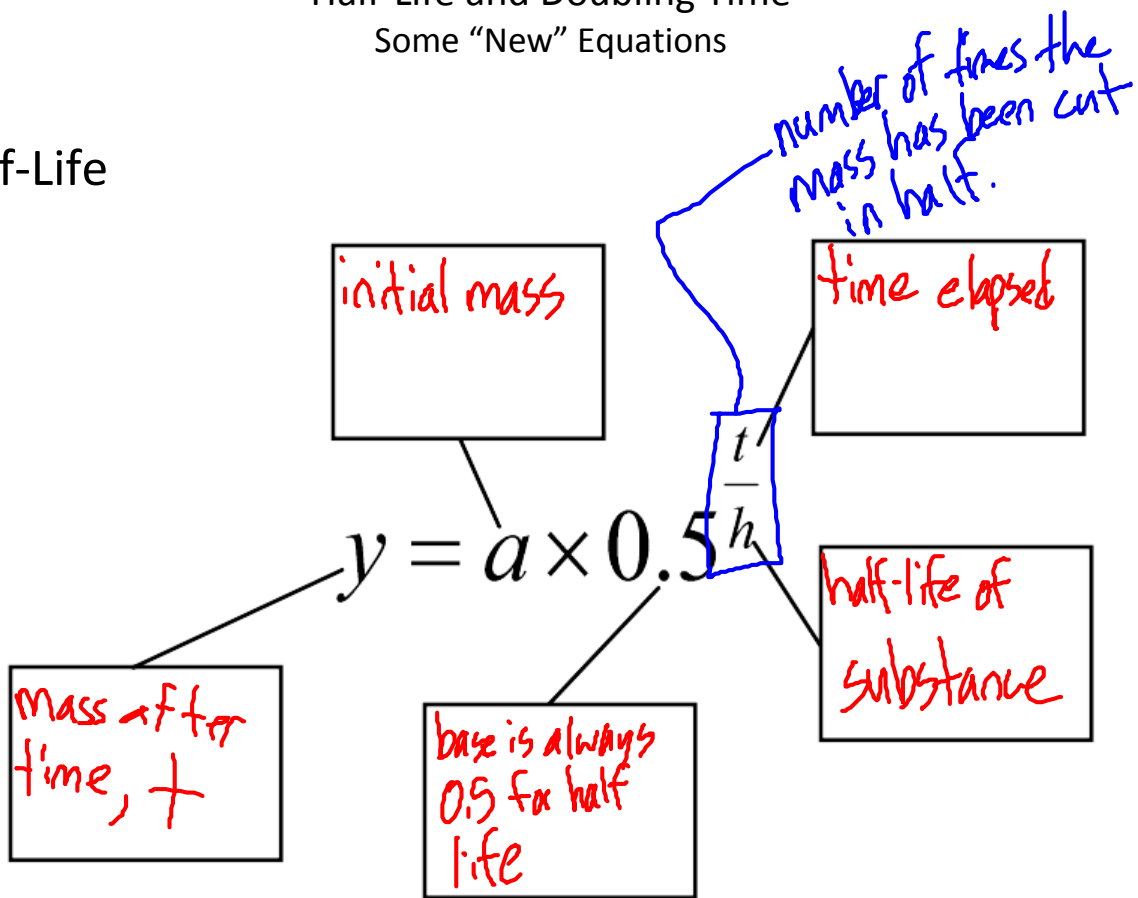
$y = 4 \times 2^{15/3}$   
 $y = 4 \times 2^5$   
 $y = 128$  cells

2. The doubling time of a bacterial strain is 7.5 hours. A strain starts with 3 cells. How many cells are present after 36 hours?

$y = 3 \times 2^{36/7.5}$

Half-Life and Doubling Time  
Some "New" Equations

Half-Life



Doubling Time

