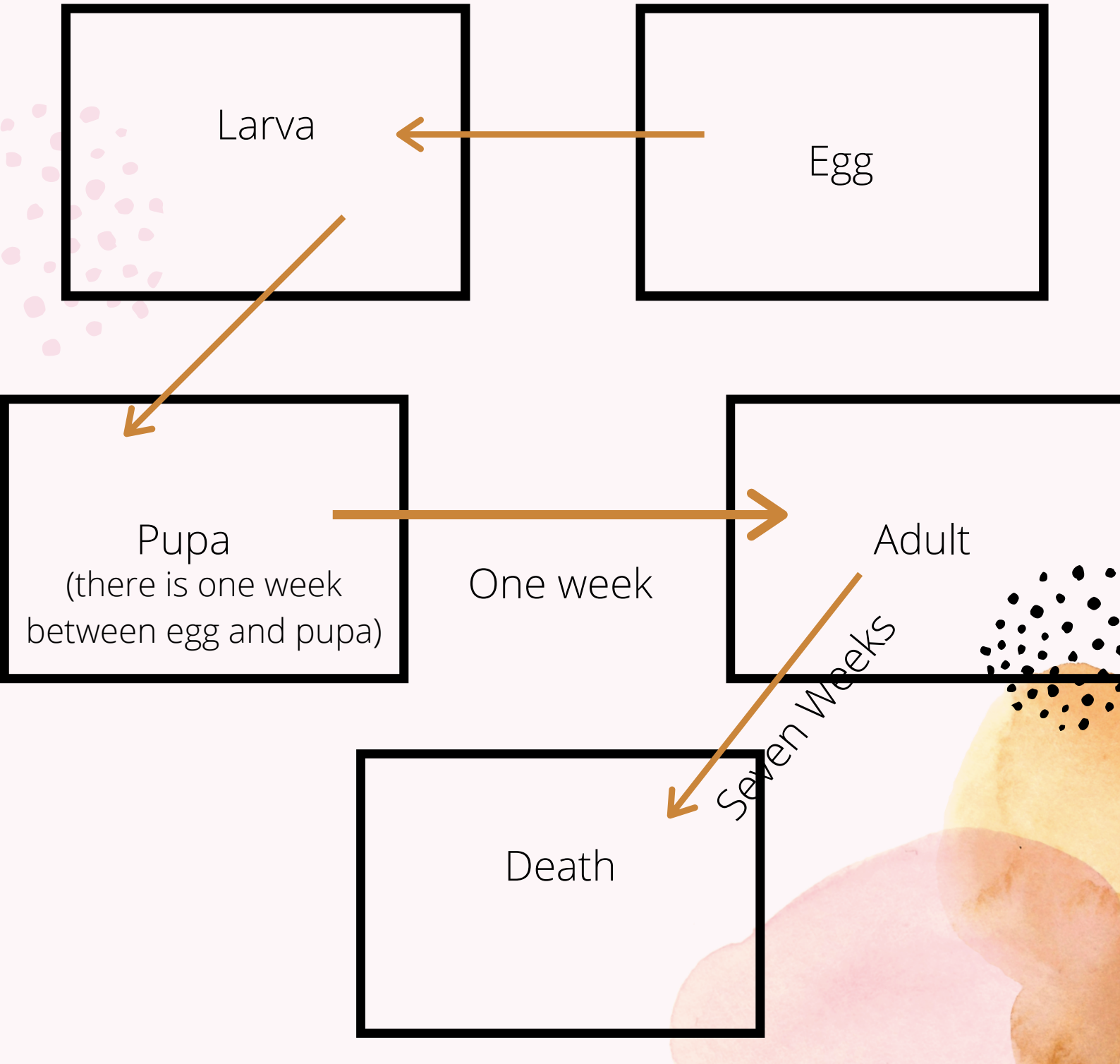
# Question 6:

## FRUIT FLIES AND THEIR FATEFUL LIVES.

Drosophilia Melanogaster (common fruit flies) are commonly used as a model for aging due to their short lifespans (so many generations can be studied in a short period of time).

The life cycle of a fruit fly is:



There is one week between eggs being laid and the fruit flies becoming a pupa. Fruit flies stay as a pupa for one week before becoming adults. Adult fruit flies live for 7 weeks before they die. Each pair (male/female) of adult fruit flies produce 10 eggs (5 male and 5 female) every week.

A researcher starts with a single pair (male/female). In the first week, as they are still pupa, there will be no adults. In the second week, the pair of pupa will become adults and therefore have 10 eggs (5 males and 2 females). In the third week, the original pair will have 10 eggs, in total, we will still have 2 adults, but 10 pupa from the second week, and 10 eggs. In the fourth week, the original pair will produce 10 more eggs and the 10 pupa from the previous week, will become adults, and the 5 pairs will produce 50 eggs. In total, there will be 12 adults, 10 pupa, and 60 eggs. This process will keep going on, remembering that an adult only lives for 7 weeks.

| | W0 | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 | W9 | W10 | W11 | W12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adults | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| | | | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 0 | 0 |
| | | | | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 0 |
| | | | | | | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| Eggs | | | 0 | 0 | | | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| | | | | 10 | 0 | | | 410 | 410 | 410 | 410 | 410 | 410 |
| | | | | 60 | 60 | 0 | | | 710 | 710 | 710 | 710 | 710 |
| | | | | | 60 | 60 | 0 | | | 2760 | 2760 | 2760 | 2760 |
| | | | | | | 410 | 410 | 0 | | | 6300 | 6300 | 6300 |
| | | | | | | | 710 | 710 | 0 | | | 20100 | 20100 |
| | | | | | | | | 2760 | 2760 | 0 | | | 30415 |
| | | | | | | | | | 6300 | 6300 | 0 | | |
| | | | | | | | | | | 20100 | 20100 | 0 | |
| | | | | | | | | | | | 51600 | 51600 | 0 |
| | | | | | | | | | | | | 30415 | 30415 |

As you can see in the above data, a pascal triangle is slowly forming. If this pattern continues, the pascal triangle would become bigger.

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