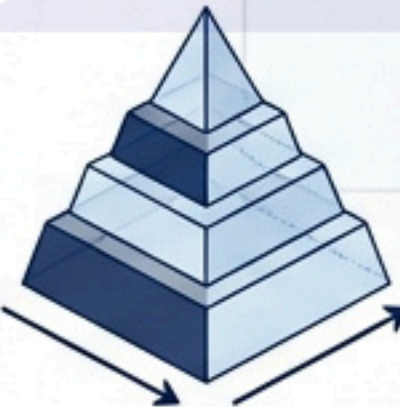


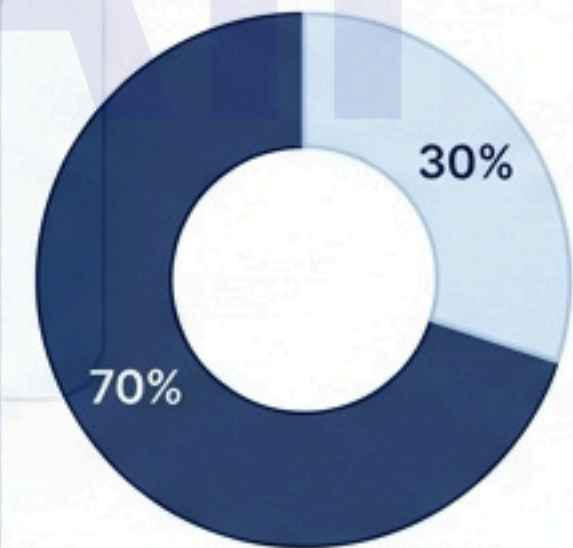


Population Attributes

Demography, Vital Rates, and the Ecological Dashboard



Age Structure



The Shift in Perspective

Individual Organism



Experiences singular, binary events.

- Is Born or Dies
- Is Male or Female

Population Level



Experiences continuous, aggregate rates.

- Has Birth Rates & Death Rates
- Has a Sex Ratio
- Has an Age Distribution

Natural selection operates at the population level to evolve desired traits.

Measuring Natality: Per Capita Birth Rate

A pond contains lotus plants over one year.



$$8 \div 20 = 0.4 \quad \text{0.4 offspring per lotus per year.}$$

In ecology, birth rate is always expressed per capita (per individual).



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Let's Test Them Now.**

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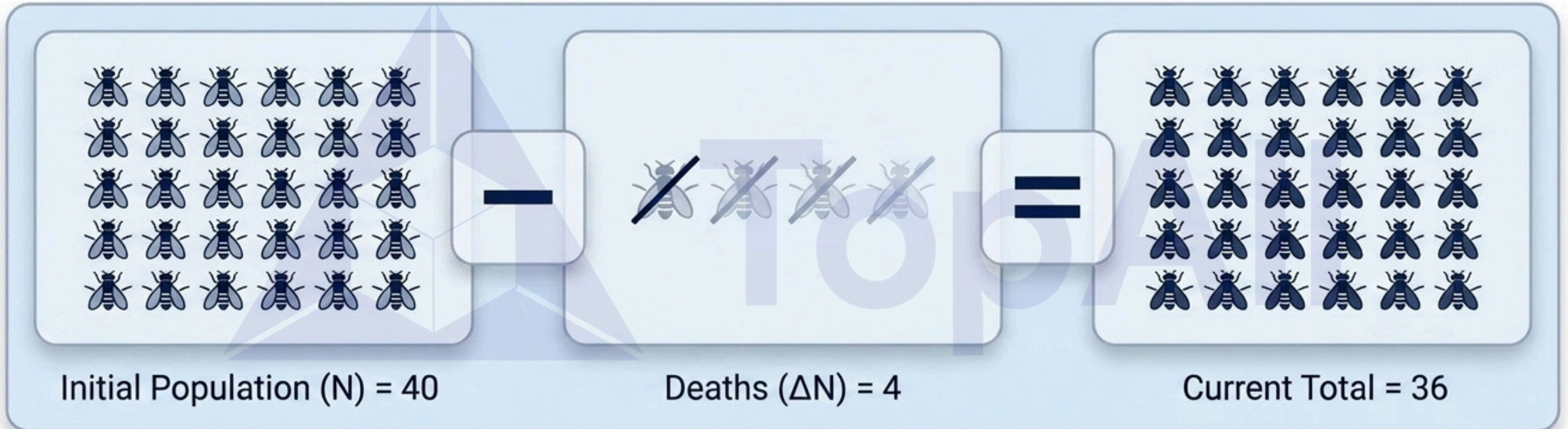
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Measuring Mortality: Per Capita Death Rate

A laboratory population of fruitflies over one week.



$$4 \div 40 = 0.1 \quad 0.1 \text{ individuals per fruitfly per week.}$$

The time interval (e.g., 'per week') is a necessary component of the rate.

Population Composition: Sex Ratio

While an individual is either male or female, a population is defined by its proportional mix.



Analytical Note

- ✓ Sex ratio impacts the reproductive potential of the population.
- ✓ A population with 90% females has a vastly different growth trajectory than one with 10% females.

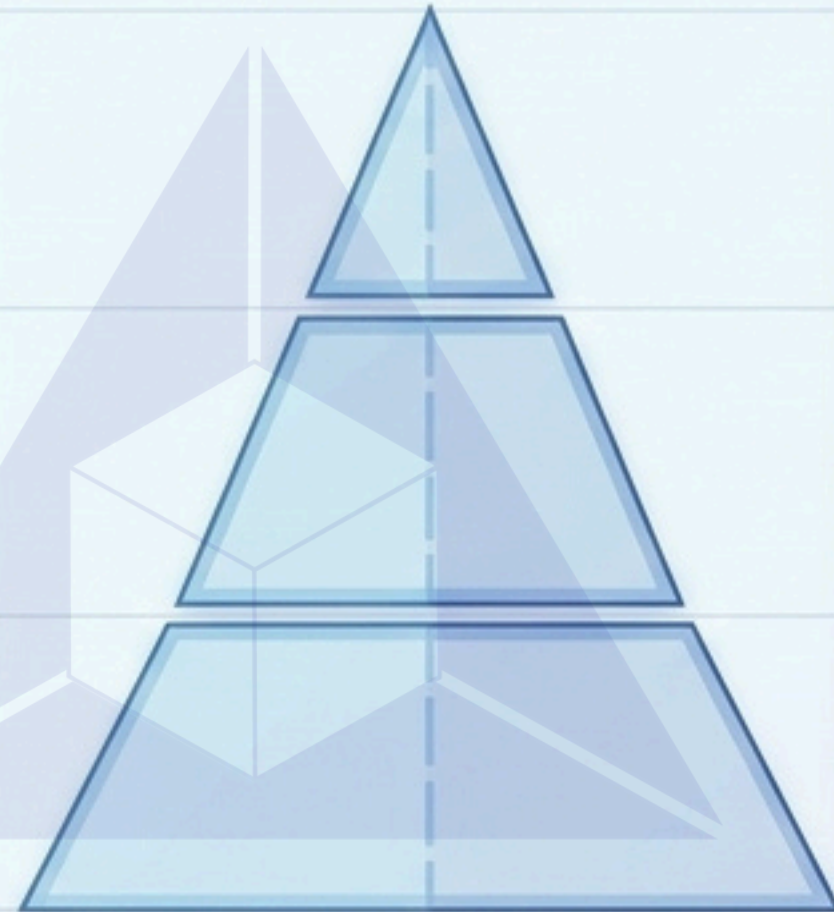
Future Trajectory: Age Pyramids

Y-Axis Legend

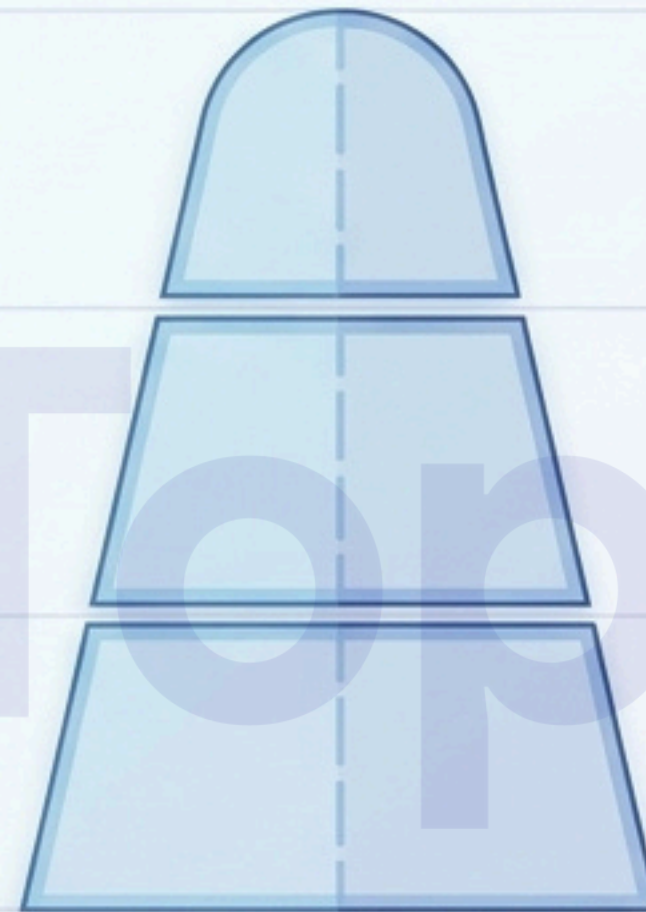
Post-reproductive

Reproductive

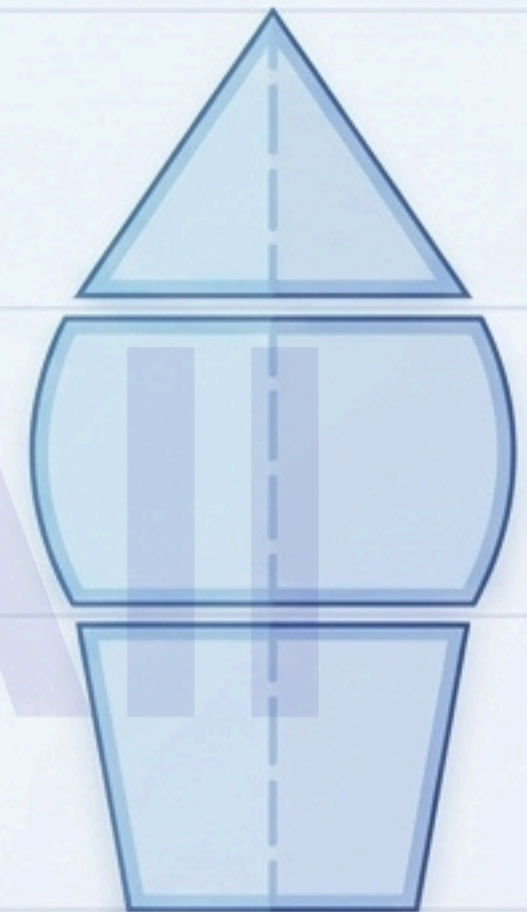
Pre-reproductive



Expanding



Stable



Declining

The relative width of the pre-reproductive base dictates the future growth status of the population.

NEET Key Takeaway: Population Attributes

Concept Vital Rates (Birth/Death)	Exam Focus Always calculated as Per Capita (Change in number $\div$ Initial population size). Watch the time interval (per year, per week).
Concept Sex Ratio	Exam Focus Individuals have sex; populations have a sex ratio (expressed as percentages or proportions).
Concept Age Pyramids	Exam Focus Expanding = Wide Base (Pre > Repro). Stable = Equal Base (Pre $\approx$ Repro). Declining = Narrow Base (Pre < Repro).

Mastering the difference between individual events and population rates is the key to demographic ecology.



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