

AP Biology
Population Ecology Practice Problems

1. There are 252 deer in a population. There is no net immigration or emigration. If 47 deer die and 32 deer are born in one month, what is the population size at the end of the month? Round to the nearest whole number.
2. In a population of 600 squirrels, the per capita birth rate in a particular period is 0.06 and the per capita death rate is 0.12.
 - a. What is the per capita growth rate of the population? Round to the nearest hundredth.
 - b. What is the actual number of squirrels that die during this particular period? Round to the nearest whole number.
 - c. What is the actual number of squirrels that are born during this period? Round to the nearest whole number.
3. In a population of 750 fish, 25 die on a particular day while 12 were born.
 - a. What is the per capita death rate for the day? Round to the nearest thousandth.
 - b. What is the per capita birth rate for the day? Round to the nearest thousandth.
 - c. What is the per capita rate of increase for the day? Round to the nearest thousandth.
4. In a population of 125 foxes, 10 die on a particular day and 22 were born on that day.
 - a. What is the per capita death rate for the day? Round to the nearest hundredth.
 - b. What is the per capita birth rate for the day? Round to the nearest thousandth.
 - c. What is the per capita rate of increase for the day? Round to the nearest thousandth.
5. There are 2,000 mice living in a field. If 1,000 mice are born each month and 200 mice die each month, what is the per capita growth rate of mice over a month? Round to the nearest tenth.
6. The doubling time of a population of plants is 12 years. Assuming that the initial population is 300 and that the rate of increase remains constant, how large will the population be in 36 years?
7. A population of 265 swans was introduced to Circle Lake. The population's birth rate is 0.341 swans/year per capita, and the death rate is 0.296 swans/year per capita. What is the rate of population growth per capita, and is it increasing or decreasing? Round to the nearest thousandth.
8. There are 190 grey tree frogs in a swamp. The population is under carrying capacity. If $r = (-0.093)$ frogs/year, predict the population size next year. Round to the nearest whole number.
9. A population of 1492 Baltimore orioles was introduced to an area of Nerstrand Woods. Over the next year, the Orioles show a death rate of 0.395 while the population drops to 1134. What's the birth rate for this population? Round to the nearest hundredth.
10. There are 780 turkeys living in Merriam Township, which is 92 acres in size. The birth rate is 0.472 turkeys/year per capita. The death rate is 0.331 turkeys/year per capita.
 - a. What is the population density? Round to the nearest tenth.
 - b. What is dN/dt ? Round to the nearest whole number.
 - c. Predict N after one year, assuming dN/dt stays constant. Round to the nearest whole number.
11. One dandelion plant can produce many seeds leading to a high growth rate for dandelion populations. If a population of dandelions is currently 40 individuals and $r_{max} = 0.2$ dandelions/month per capita, predict how many dandelions would be in this population after 4 months. Round to the nearest whole number.
12. Imagine the dandelion population of 40 (in #11) cannot continue to grow exponentially due to lack of space. The carrying capacity for their patch of lawn is 70 dandelions. What is their dN/dt in this logistic growth situation? Round to the nearest tenth.