Case Study 1
Fireweed

The first step is to determine the size of the population (and population density) over a certain area. What would be the best method?

- ✗ A. Full census
- ✗ B. Mark-recapture
- ✓ C. Quadrat
- ✗ D. None of the above

Considering that fireweed seeds are scattered by the wind, what type of dispersion would you expect to see as the fireweed 1st colonize the area? (Resources such as nutrients and water spread evenly).

- ✗ A. Clumped
- ✓ B. Random
- ✗ C. Regular
- ✗ D. None of the above

Considering that fireweed has just been introduced to an environment that is devoid of other plants and where resources are evenly spread, what type of growth should we see in the fireweed?

- ✓ A. Exponential
- ✗ B. Linear
- ✗ C. Logistic
- ✗ D. None of the above

The estimation of the population size indicates that there are 132 fireweed plants over an area of 1 km^2. One year after the first measurement, a second estimate is made. This time, there are 1980 fireweed plants. What is the population's growth rate?

- ✗ A. 11 /fireweed/year
- ✓ B. 14 /fireweed/year
- ✗ C. 15 /fireweed/year
- ✗ D. None of the above

Before the soil of the patch of land is ready to sustain new plant species, it needs approximately 10 fireweeds/m^2. If there are no limiting factors, how many years will it take for the soil to be ready? (It took 1 year for the population to go from 132 to 1980 fireweeds and r = 14).

- ✗ A. 2-3 years
- ✗ B. 3-4 years
- ✓ C. 4-5 years
- ✗ D. None of the above

Considering that fireweeds are usually the first plants to appear in places where natural disasters take place, what type of strategies do you think they use? Do you think their rate of reproduction is adapted to this type of strategy?

✗ *A.* *k*-strategy; no

✗ *B.* *k*-strategy; yes

✗ *C.* *r*-strategy; no

✓ *D.* *r*-strategy; yes

Once fireweeds reach a certain density, the soil will become more fertile and other plants will start to grow (which is exactly what we wanted at the beginning!). Most of these plants will use the same nutrients that the fireweed uses and will provide shade for the fireweeds (which need lots of sun to grow). What will happen to the fireweed's growth rate as the density of other plants increases?

- ✗ A. It will increase
- ✗ B. It will stay the same
- ✓ C. It will decrease
- ✗ D. None of the above

Once fireweeds reach a certain density, the soil will become more fertile and other plants will start to grow (which is exactly what we wanted at the beginning!). Most of these plants will use the same nutrients that the fireweed uses and will provide shade for the fireweeds (which need lots of sun to grow). What type of factor is the arrival of new plants?

- ✗ A. Density dependent abiotic factor
- ✓ B. Density dependent biotic factor
- ✗ C. Density independent abiotic factor
- ✗ D. Density independent biotic factor

Case Study 2
Seal hunting

What method should you use to estimate the seals' population density?

✗ A. Full census

✓ B. Mark-recapture

✗ C. Quadrat

✗ D. Transect

✓ [Default]
✗ [MC Any]
✗ [MC All]

Let’s say you decided to use the mark-recapture method to measure the number of seals. You initially capture 2000 seals and mark them. Afterward, you capture another 2000 seals. Of these, only 4 are marked. What is the population’s size?

✗ A. 400,000

✗ B. 800,000

✓ C. 1,000,000

✗ D. None of the above

✓ [Default]

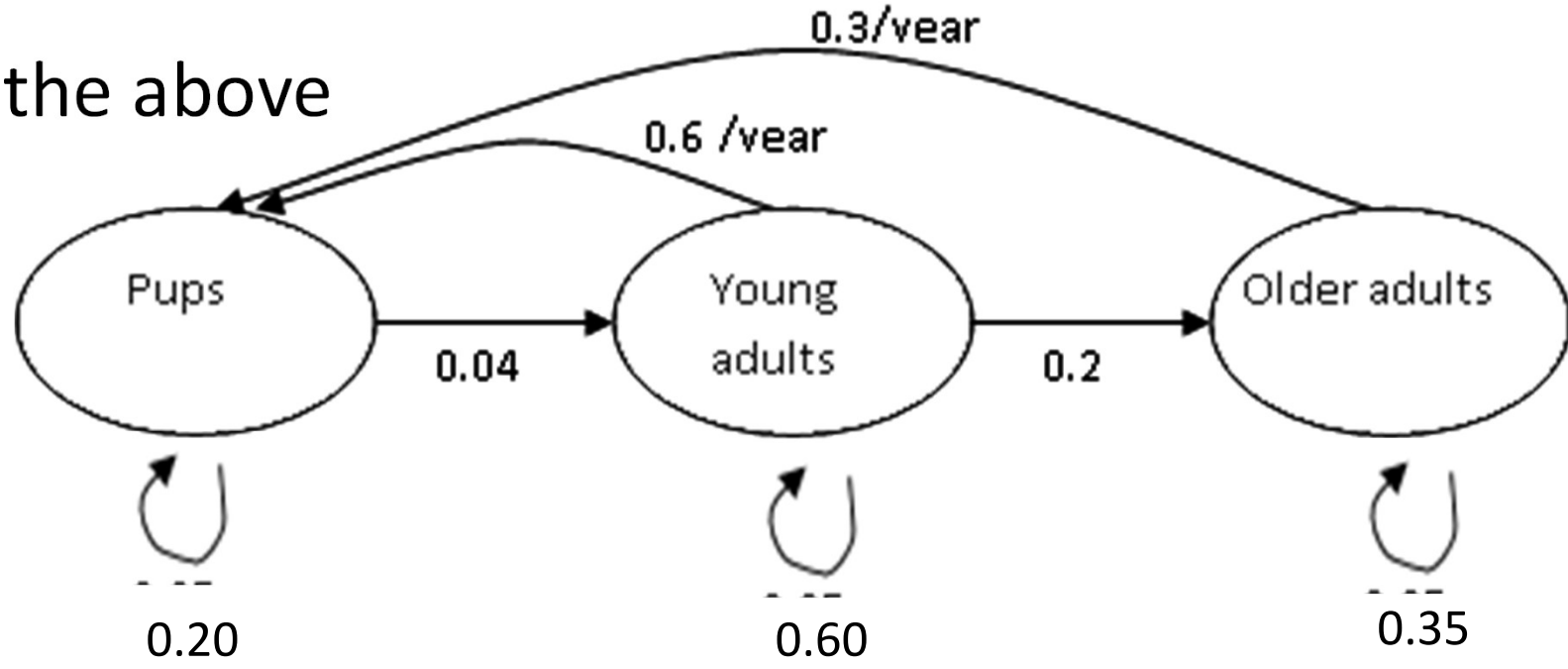
✗ [MC Any]

✗ [MC All]

The seal population size in 1970 is depicted below. What would be the size of the pup population in 1971?

- ✗ A. 170,000
- ✗ B. 204,154
- ✗ C. 2,000,000
- ✓ D. 301,000
- ✗ E. None of the above

Pups:	650,000
Young adults:	250,000
Older adults:	70,000

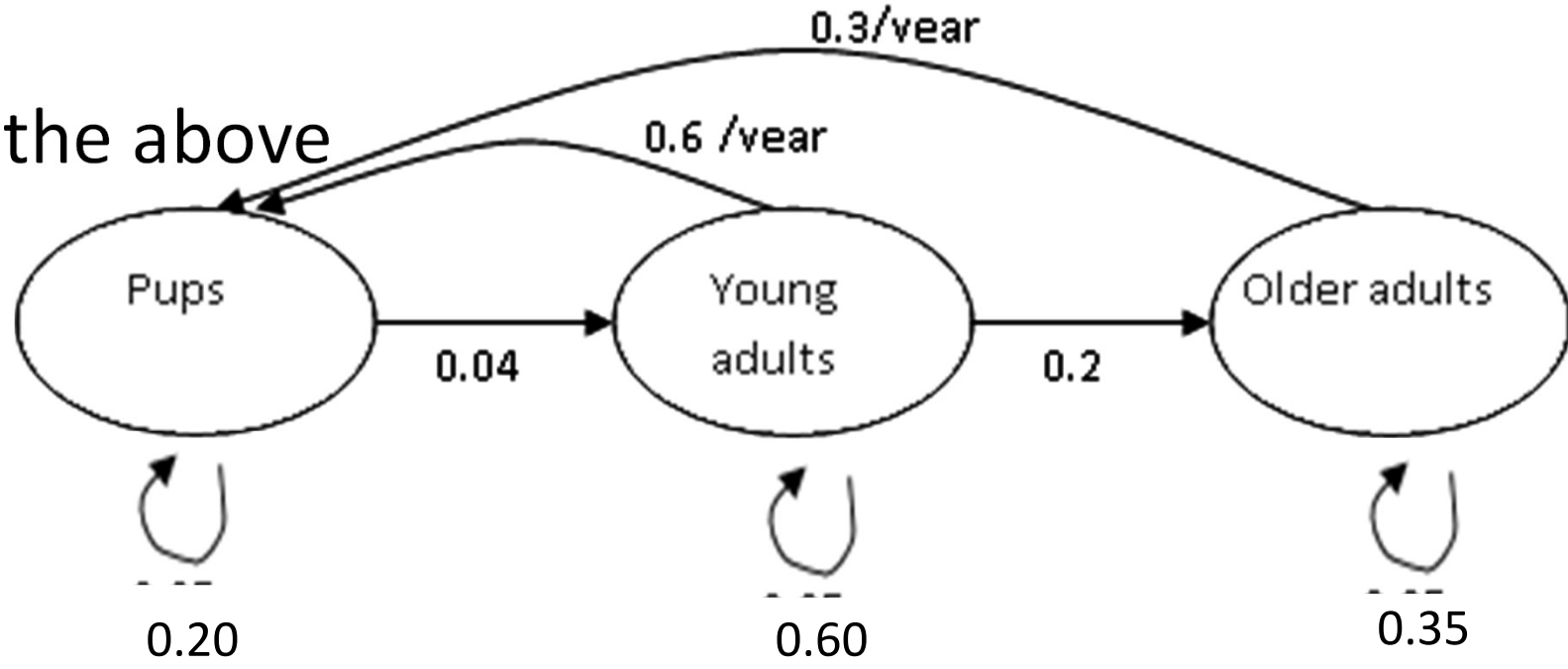


- ✓ [Default]
- ✗ [MC Any]
- ✗ [MC All]

The seal population size in 1970 is depicted below. What would be the size of the entire seal population in 1971?

- ✗ A. 270,000
- ✗ B. 255,000
- ✓ C. 551,500
- ✗ D. 304,500
- ✗ E. None of the above

Pups:	650,000
Young adults:	250,000
Older adults:	70,000



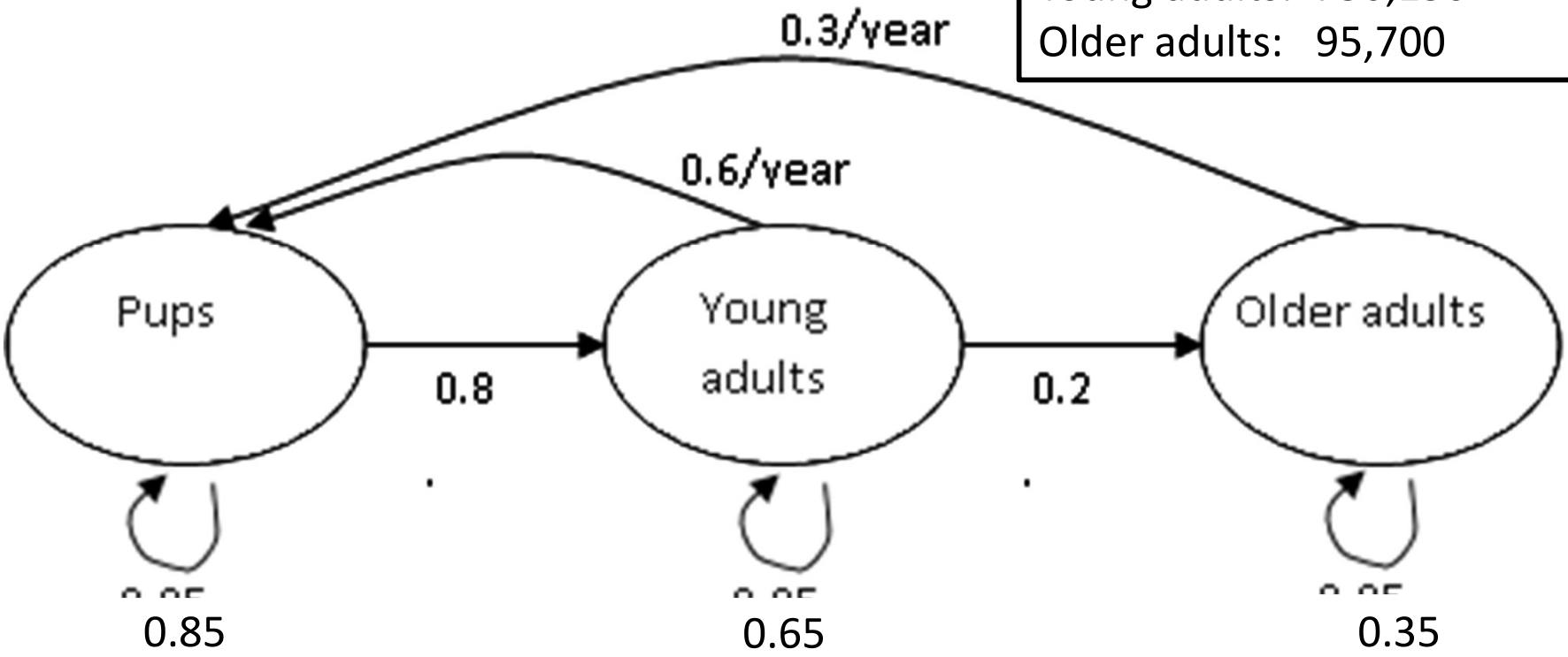
✓ [Default]
✗ [MC Any]
✗ [MC All]

What is the yearly growth rate of the seal population in 1970? Based on your findings, what advice would you have given to the Canadian Fisheries and Oceans as to the sealing quota for 1971?

1976 Seals Population

Calculate the growth rate (r) of the 1976 seal population. Based on your findings, what advice would you have given to the Canadian Fisheries and Oceans as to the sealing quota for 1976?

Pups:	1,150,000
Young adults:	750,150
Older adults:	95,700



What are the different factors that might influence the growth rate of the seal population? Find as many as possible and classify them (biotic/abiotic and density dependent/independent).

What type of reproductive strategy (r or k strategy) do you think seals have? Explain.