

while you can run the (flash) genetic drift applet yourself, we have generated a data set for you. We examined 24 populations at each of various population sizes (N) over the course of 100 generations.

flash genetic drift applet

http://www.radford.edu/~rsheehy/Gen_flash/popgen/

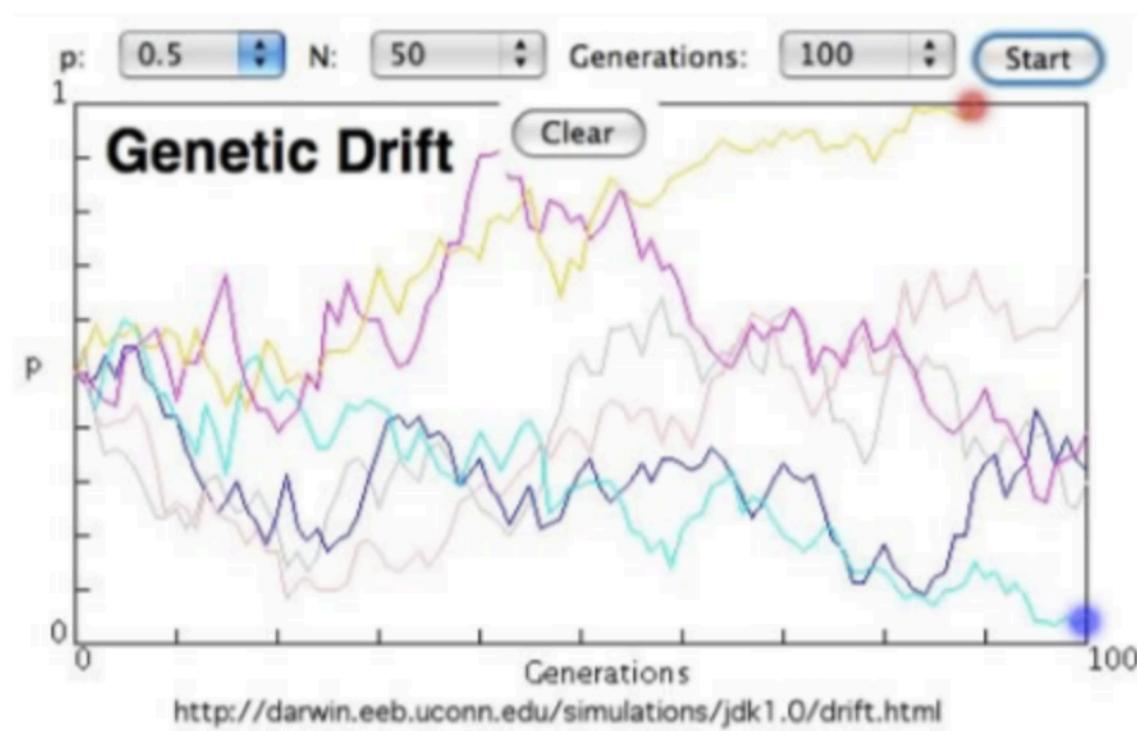
The number of times one or the other allele is lost is given

L.	Pop. Size	L
	N=10	24
	N=25	21
	N=50	10
	N=100	4
	N=250	1

From this data, you can calculate the frequency of allele loss (f_L), which is equal to $L/24$.

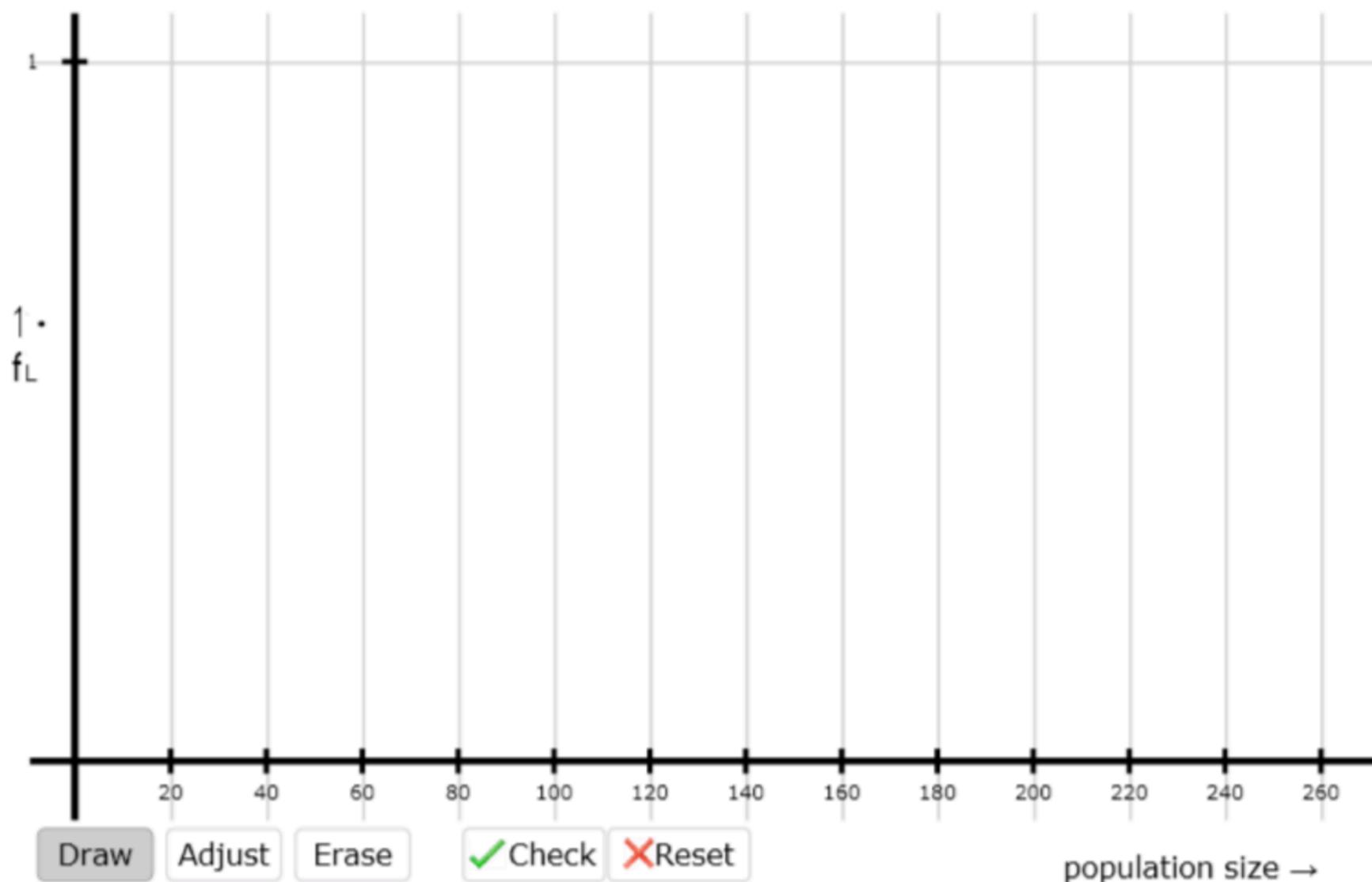
Calculate the value of f_L for each population (and write it down).

On the next page make a graph of f_L as a function of population size.



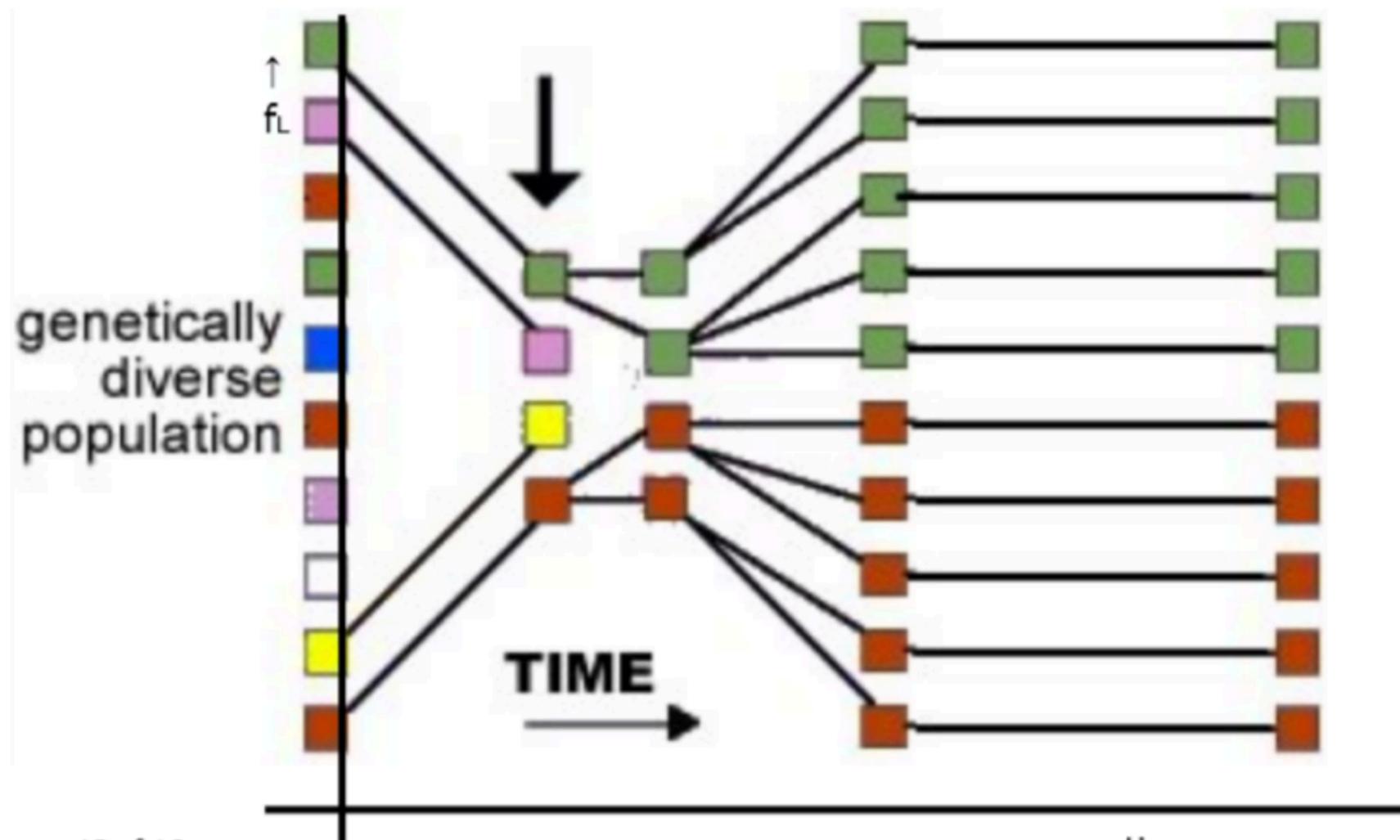
Take your data from the previous page and draw a graph of the relationship between population size and f_L

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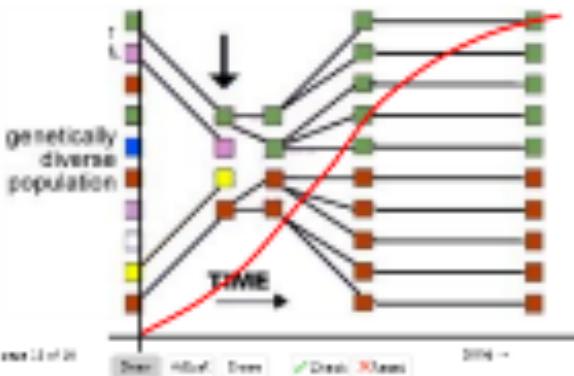
You begin with a genetically diverse population at t=0. A population bottleneck occurs (down arrow) after which the population rapidly increases in size.

Draw a curve that represents the impact of genetic drift (f_L) as a function of time.



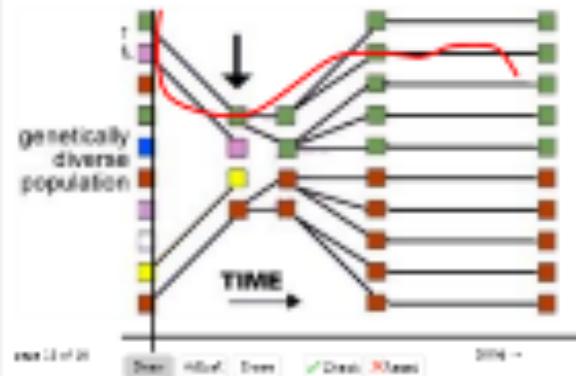
impact of genetic drift

You begin with a genetically diverse population of 100. A population bottleneck occurs when you 100 after which the population rapidly increases in size.
Black arrows mean represents the impact of genetic drift just as a function of time.



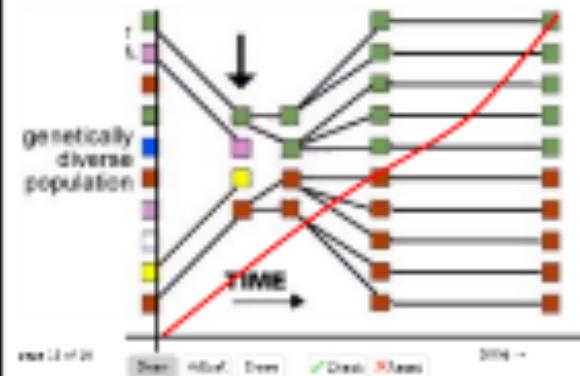
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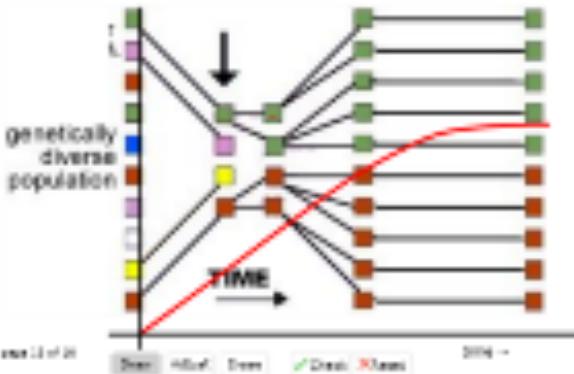
30568

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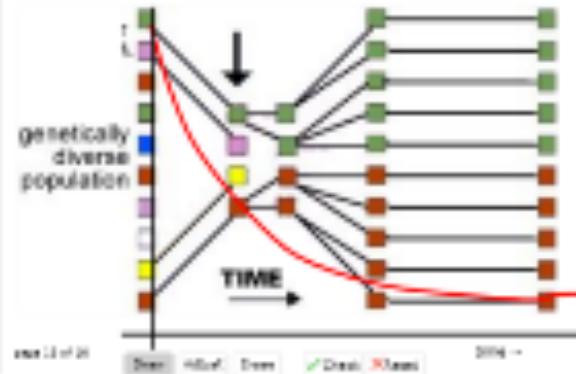
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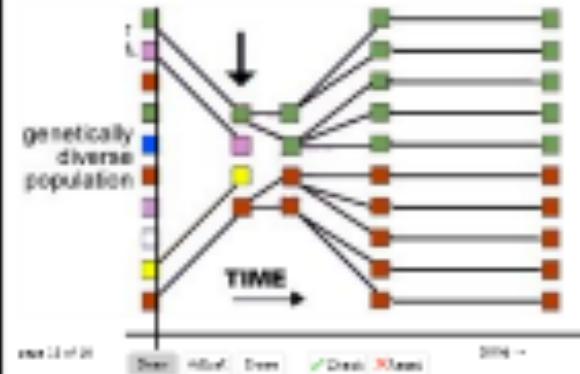
30573

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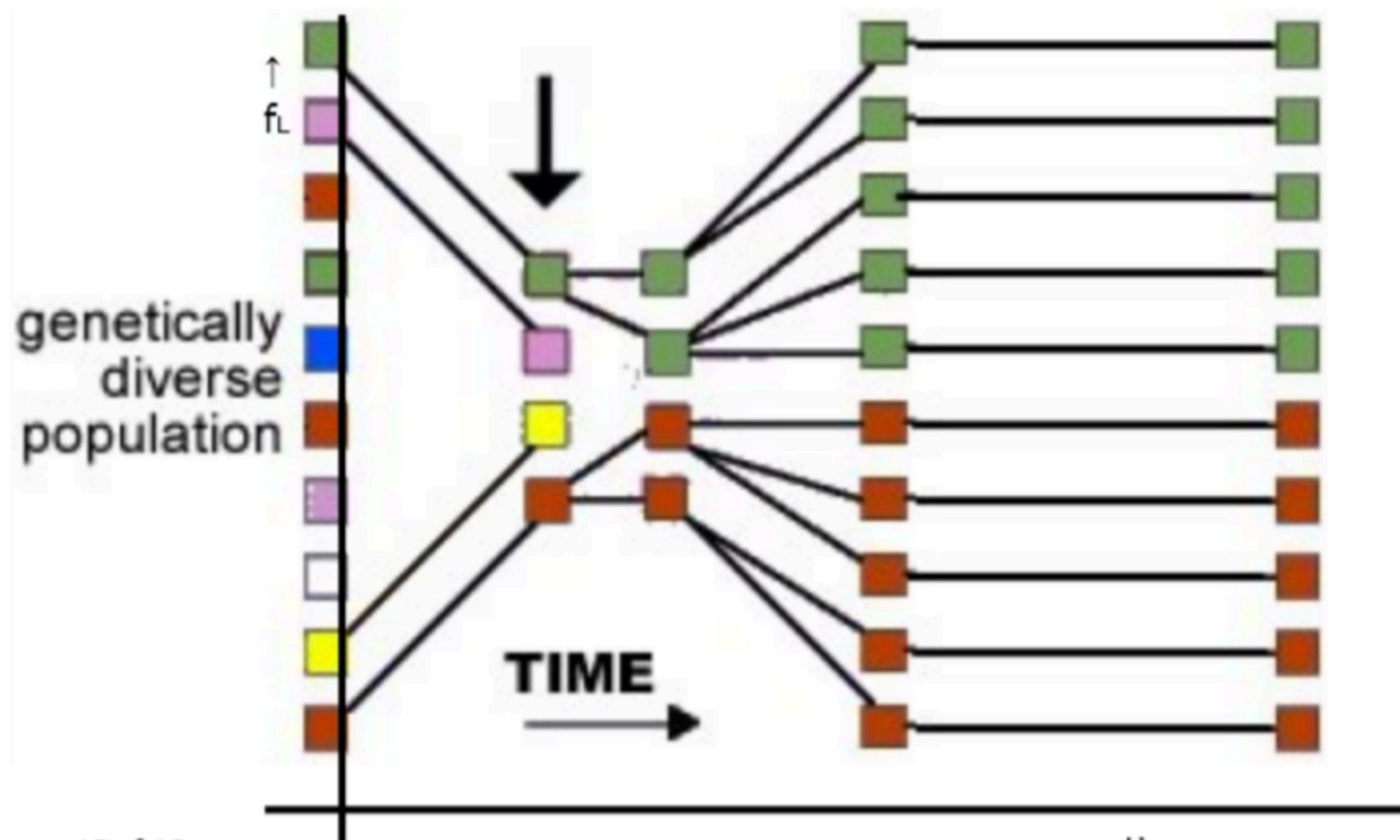
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30576

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Draw a curve that represents the impact of genetic drift (f_L) as a function of time.



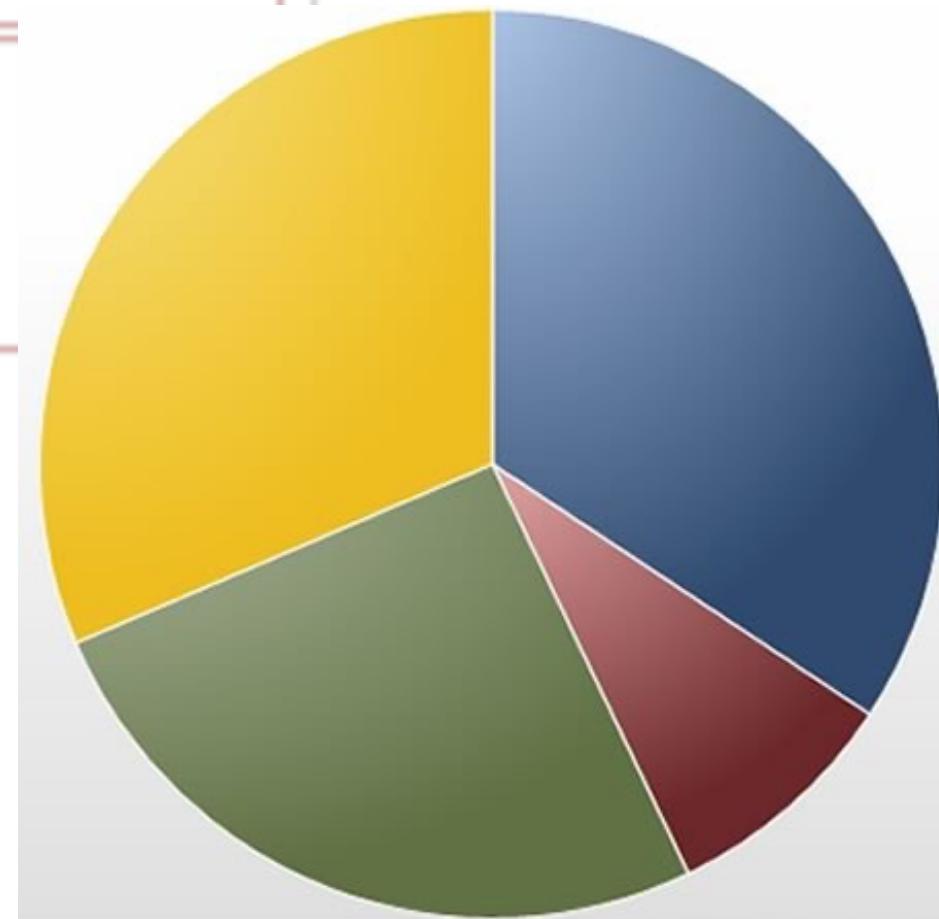
Immediately after a genetic bottleneck we predict that the effects of genetic drift will

- be unaffected
- increase

explain your logic behind your choice

If genetic drift leads to the fixation of a deleterious allele, we can expect ...

explain your logic behind your choice

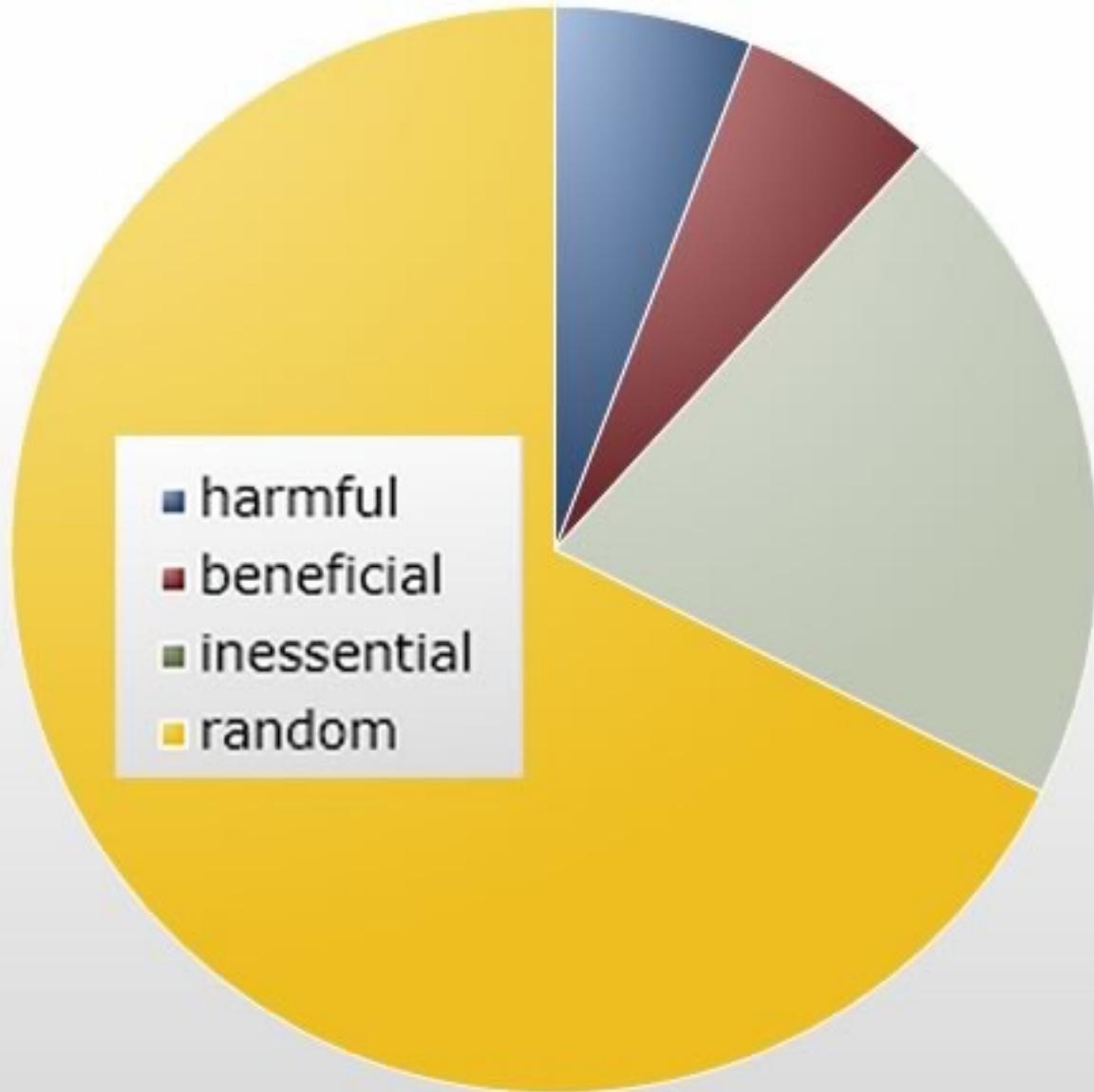


- subsequent evolutionary events to reduce these negative effects
- the species to go extinct
- the gene with the deleterious allele to be deleted
- the negative trait will be maintained

Explain (in the box below) what is genetic drift and how can it influence the evolution of a population.

The allele lost due to genetic drift will be ...

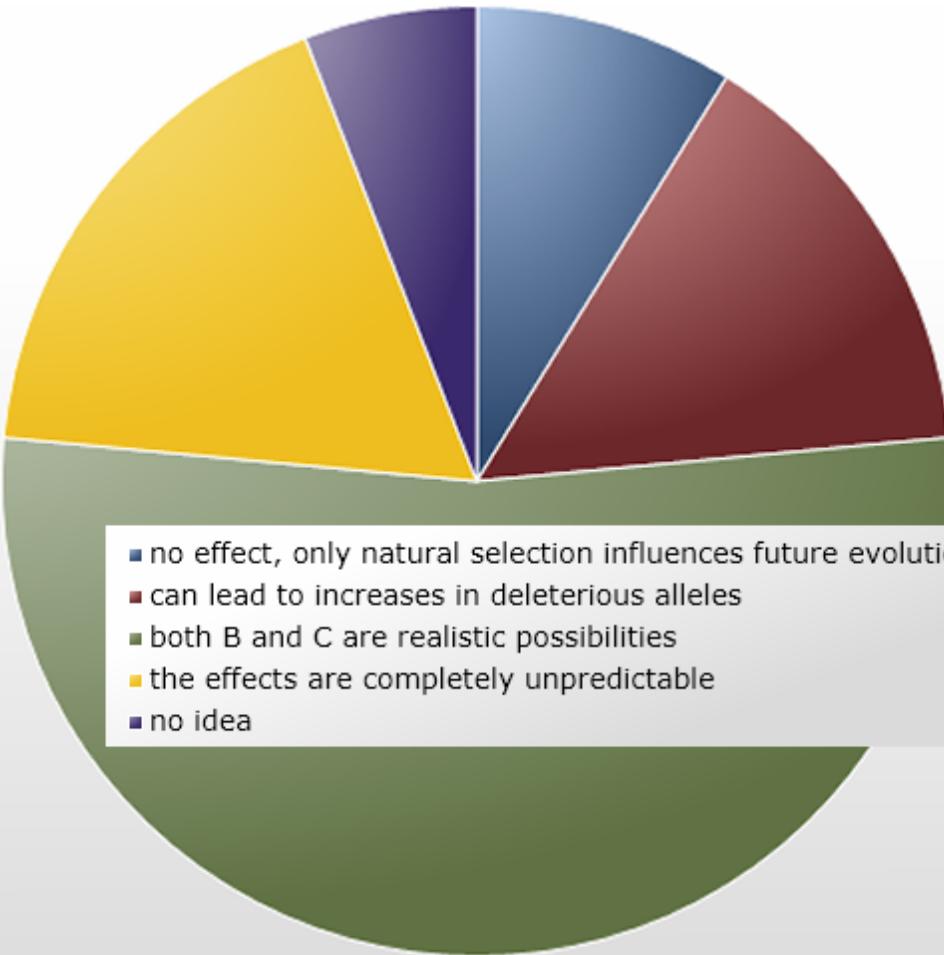
- harmful
- beneficial
- essential
- inessential
- random
- always the same



Which ones are wrong and why?

exp

How can the size of a population influence a population's future evolution?



Explain the logic of your answer

9-Chapter 3.5 read pages 71-87 first

page 1 of 7

Consider how genes are organized along a chromosome... as you currently understand it.
Draw a diagram of a region of a chromosome that contains 6 genes. Describe how a mutation
in one gene could influence the activity of another gene in this region.

explain your logic.

9-Chapter 3.5 read pages 71-87 first

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Draw Erase Close

9-Chapter 3.5 read pages 71-87 first

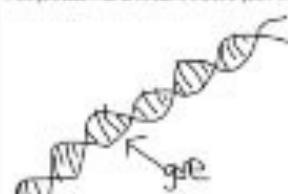
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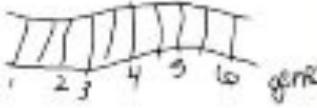
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Erase

Reset

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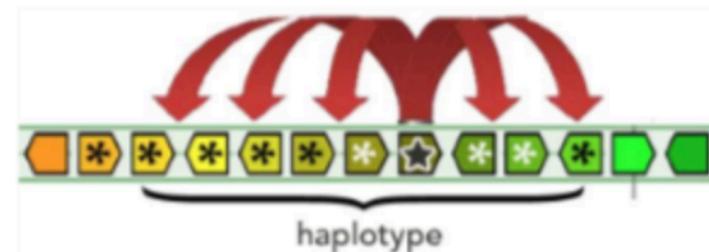


Draw

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Reset

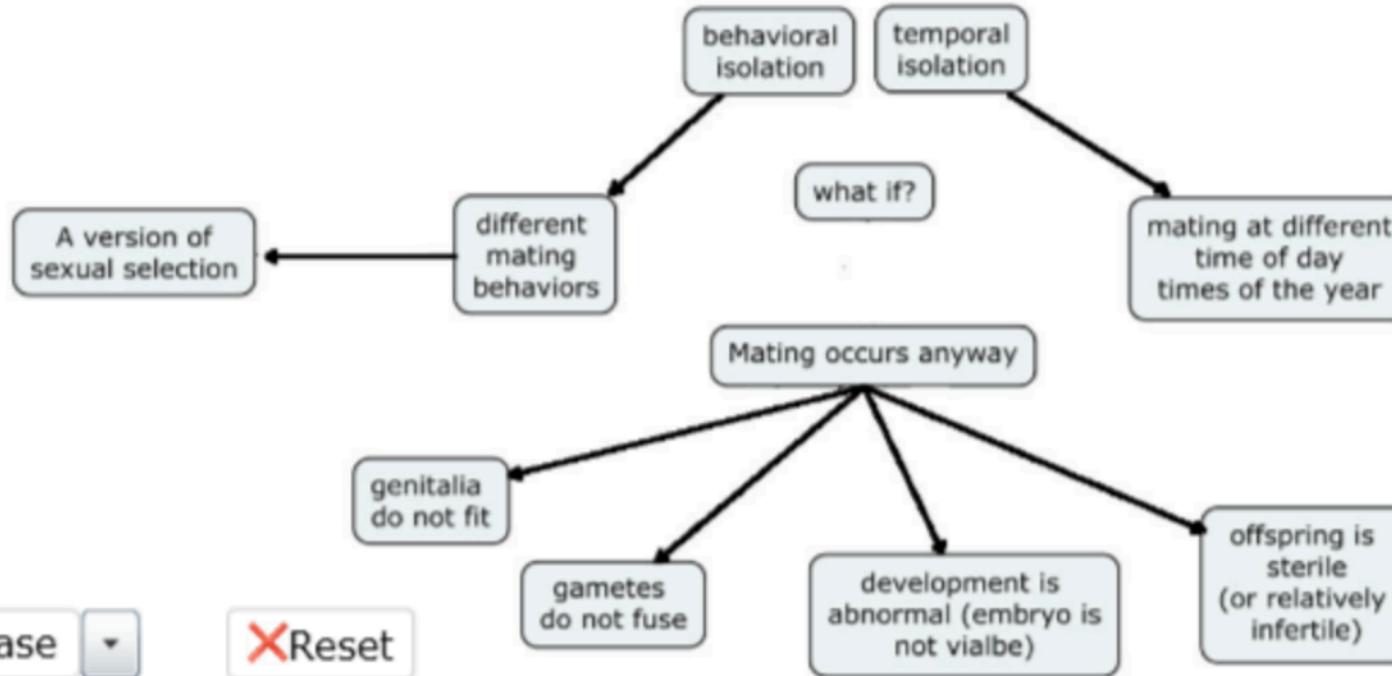
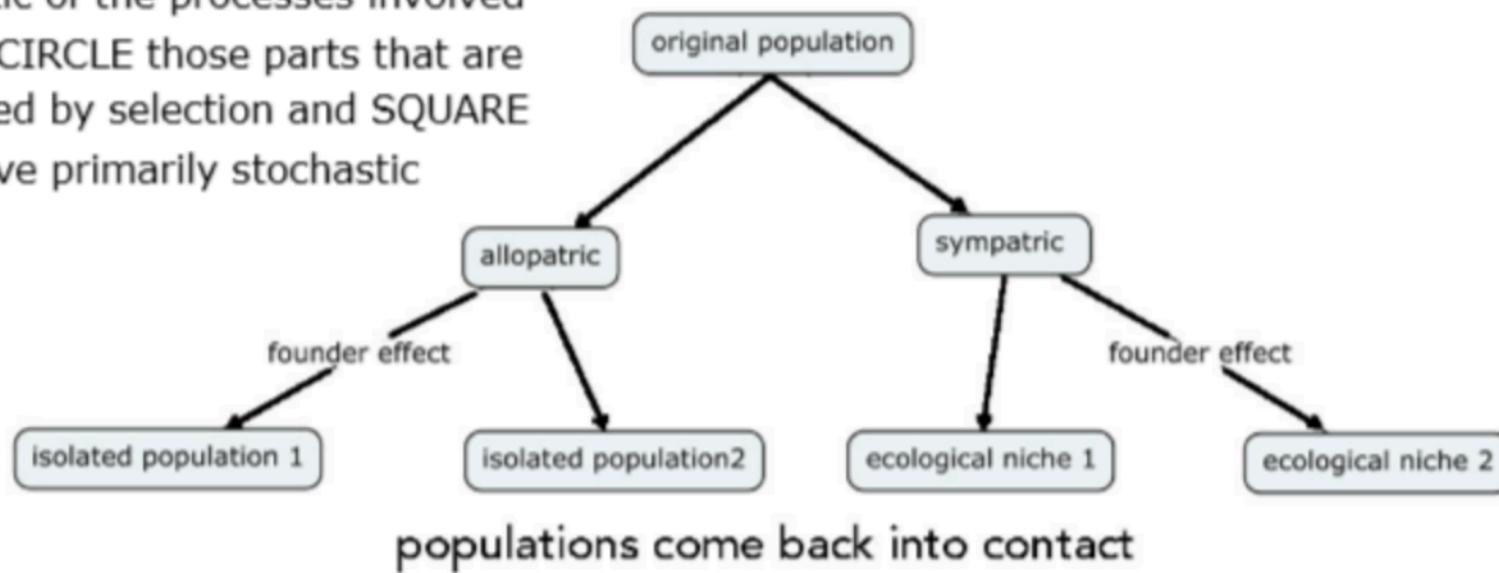
Genes are arranged along DNA molecules (chromosomes). Explain how an allele of a gene with a strong effect on reproductive success can influence the frequency of the alleles of genes located near it.



Assume that one of these neighboring genes has a negative effect on reproductive success, how could that effect over-ride the effects of the positively acting gene? explain your reasoning in the text box

39. How does the linkage of genes along a chromosome influence evolutionary processes?
40. What, exactly, is the difference between a gene and an allele? a gene and a chromosome? How many DNA molecules in a chromosome?

Here is schematic of the processes involved in speciation. CIRCLE those parts that are primarily involved by selection and SQUARE those that involve primarily stochastic effects



Draw

Erase

Reset

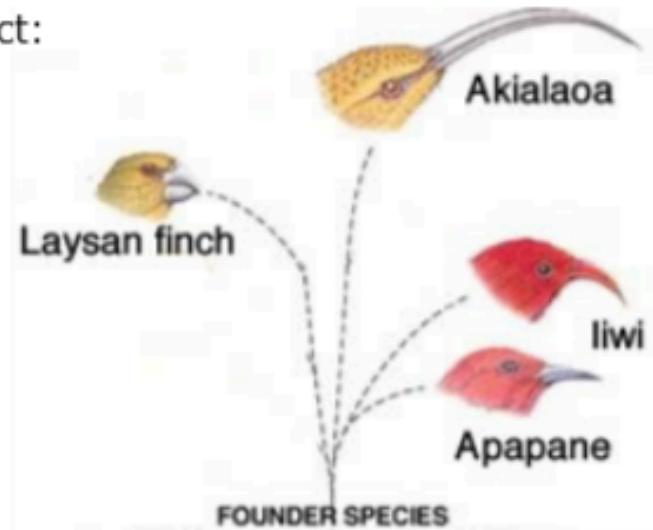
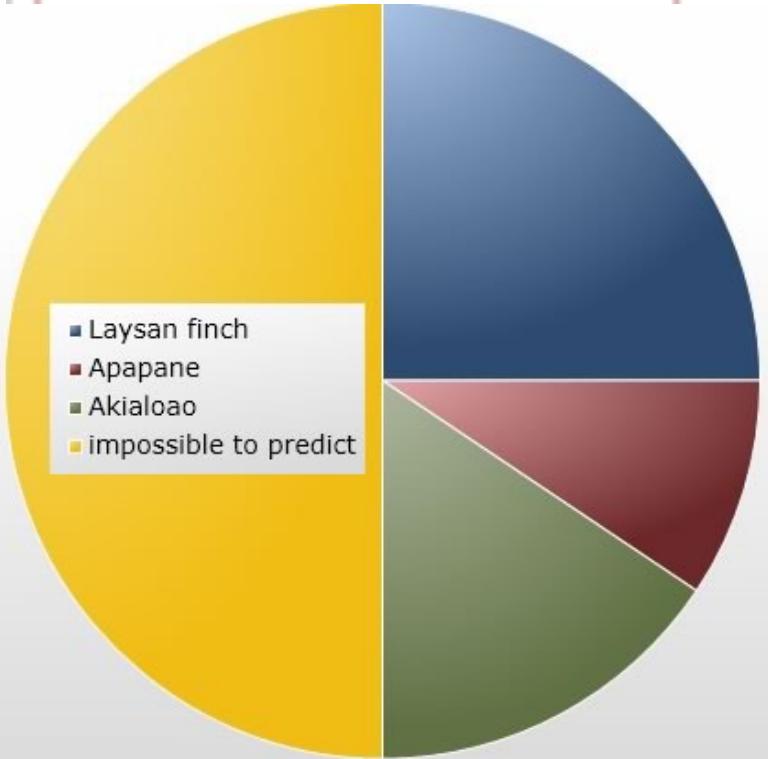
What does it mean to say that speciation is a continuous process? How is it related to the continuity of life and the presence of a last common ancestor.

Is speciation a selectable trait? What is its evolutionary value ?

Which of these species of finch is the most likely to go extinct:

- Laysan finch
- Iiwi
- Apapane
- Akialaoao
- impossible to predict

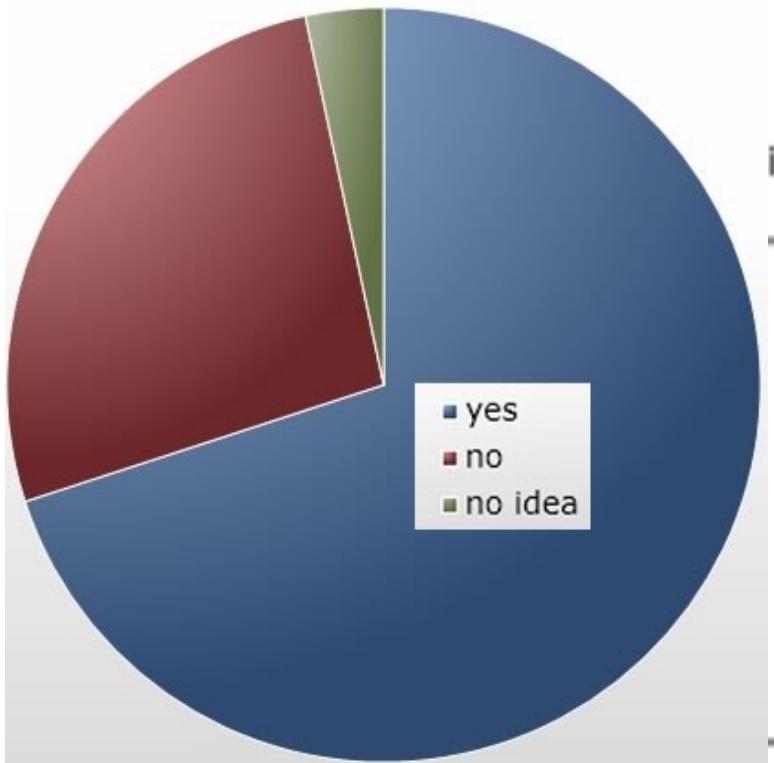
explain why a reproductive barrier between populations



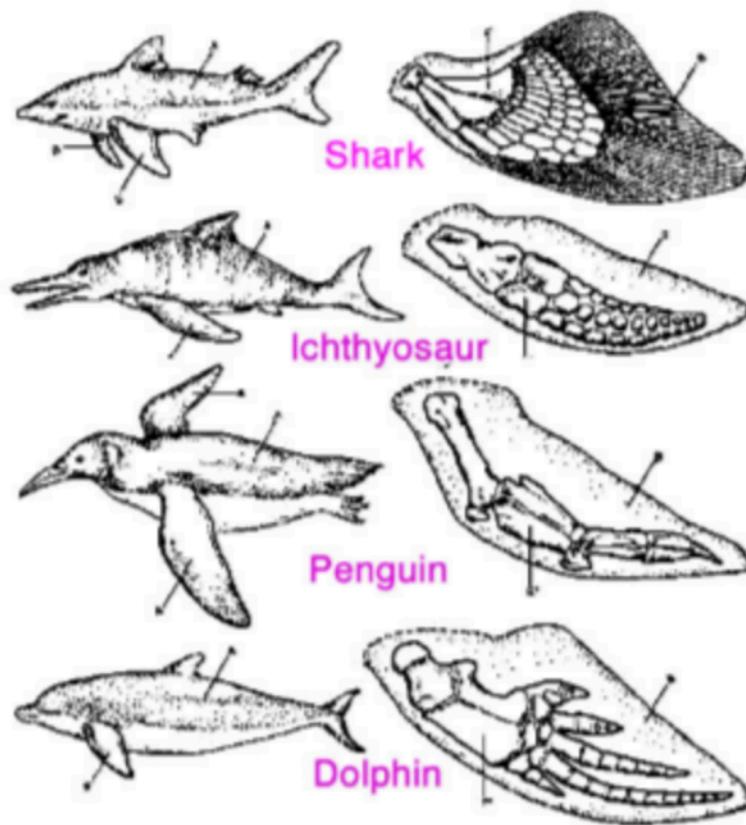
42. What is involved in establishing reproductive isolation between populations (species formation); what factors favor speciation?
43. How are sympatric and allopatric speciation the same and how do they differ?
44. Describe the (Darwinian) cycle of selection associated with the development of a trait, such as the extended neck of giraffes. Consider the feedback between behavior and anatomy.

Here are four examples of convergent evolution.
Did their common ancestor have fins?

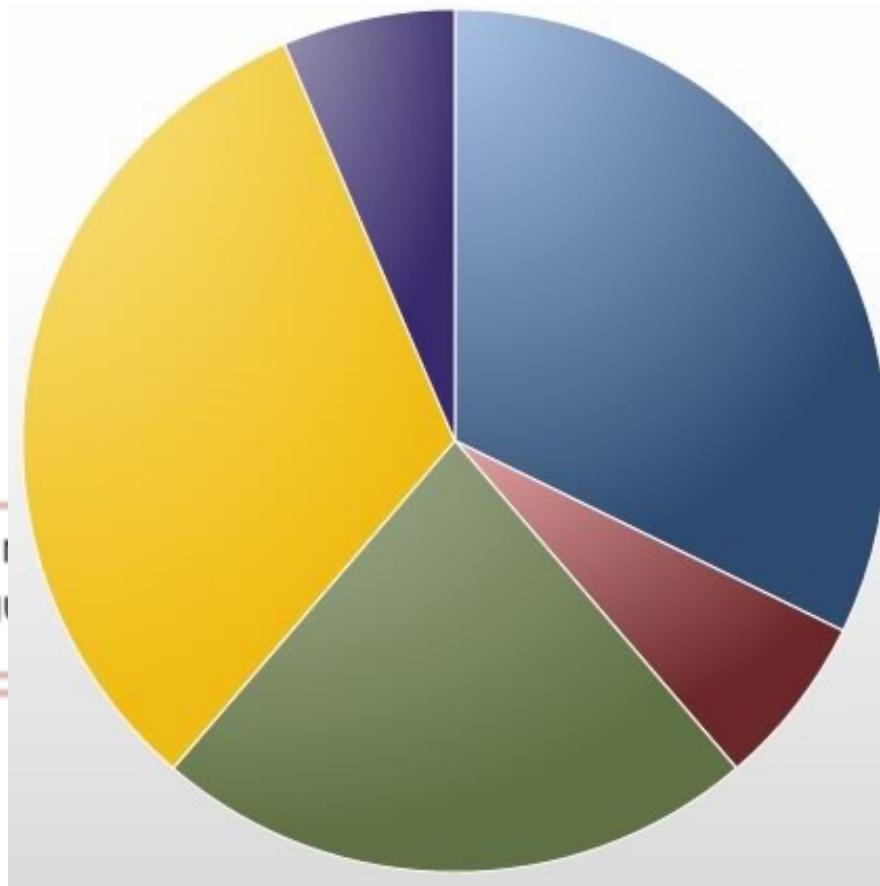
- yes
- no
- impossible to tell, their ancestors are extinct
- no idea



similarities



Which of these traits do you find the **MOST** difficult to accept as a product of evolutionary mechanisms?



Explain your reasoning for your evolution argument

be the most compelling anti-

- loyalty to a mate / life partner
- loyalty to a social group
- the social aspects of adult lactose tolerance
- the randomness of mutation
- the frequency of extinction

45. How would you decide whether vitamin C dependences in Haplorrhini and guinea pigs were independent events?
46. How would you decide whether a trait is primitive (ancestral) or specialized (derived)?
47. Describe a scenario in which the loss of a trait or a gene is beneficial?
48. Explain why the loss of a trait or convergent evolution complicates lineage analysis?
49. Describe a scenario in which the simplification of a complex organism would be selected for?
50. Construct a diagram that shows the difference between homologous and analogous traits, and use it to explain the difference.

Monday 25 Sept	Chapter 4.2 Social and Sexual Selection	85-106	Complete beSocratic #11
Wed. 27 Sept	Chapter 4.3 Social and Sexual Selection	85-106	Complete beSocratic #12
Friday. 29 Sept	REVIEW for midterm #1		previous midterm
Monday 2 Oct	first midterm exam		exam answers