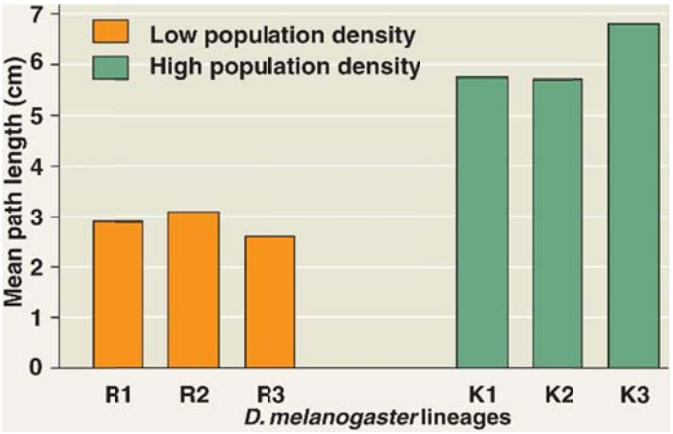
Ecology Math Problems



Population	R Populations Mean Distance (cm)	K Populations Mean Distance (cm)
1	2.9	5.8
2	3.1	5.75
3	3.5	6.8

There are two alleles that regulate how far *Drosophila* larvae ravel when foraging for food. On the average the larvae carrying the for^R ("Rover") allele travel nearly twice as far while foraging as larvae with the for^S ("Sitter"). Both the "Sitter" and "Rover" alleles are present in the natural population.

An experiment was done in which three populations of fly larvae were kept at low densities (R) for 74 generations and three populations of fly larvae were kept at high densities (K) for 74 generations. The mean path of foraging was measured for the 74th generation for the six populations and the graph is shown above.

1. What was the question being investigated?_____
_____
_____

2. Purpose a hypothesis for this experiment._____
_____
_____

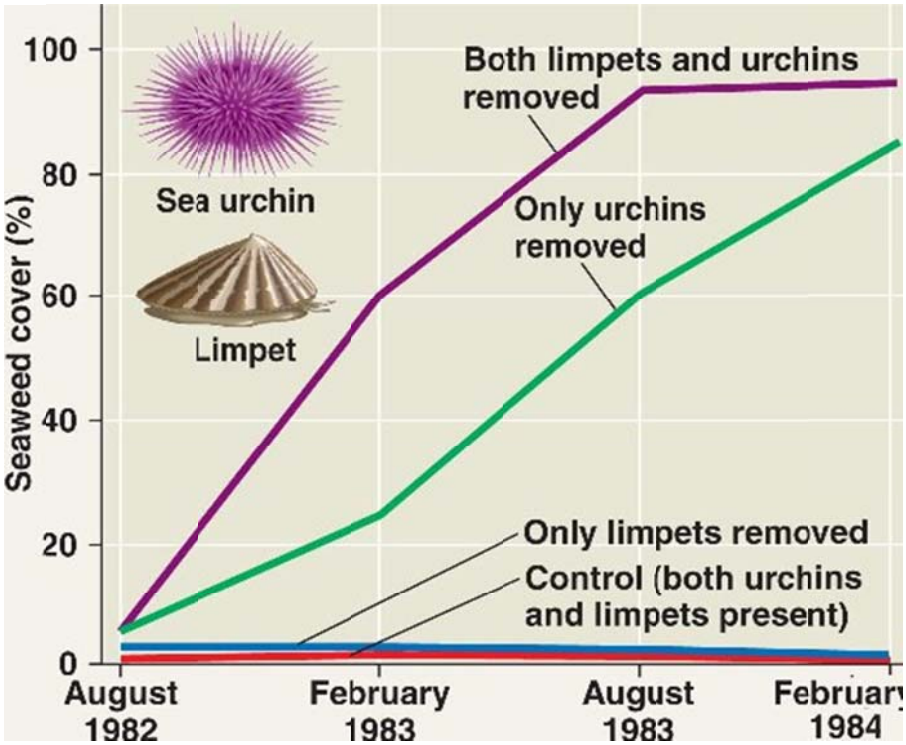
3. Determine the mean for the two different populations_____

4. Determine the standard deviation for the “R” flies and the “K” flies and determine the difference between these two means. _____

5. Does the difference between these two experimental groups appear to be significant?_____

6. Purpose a null hypothesis for this experiment._____
_____
_____

7. Perform a t-test and determine if your null hypothesis is rejected or accepted and explain why._____
_____
_____
_____



Both limpets and sea urchins feed upon seaweed. Four different areas were investigated for the percentage of seaweed cover. In the area I, both the limpets and sea urchins and limpets were removed, in area II only the sea urchins were removed, in area III only the limpets were removed and finally in area IV both the limpets and urchins were present. The percent of seaweed coverage was measured every year for six month intervals and the results were graphed above.

8. What was the question that the scientist was investigating?_____
_____
_____

9. Purpose a hypothesis for this experiment_____
_____
_____

10. Determine the monthly rate of increase for area I and II from February 1983-August 1983 assuming a six month interval.

11. What can be concluded based on the data presented?_____

_____

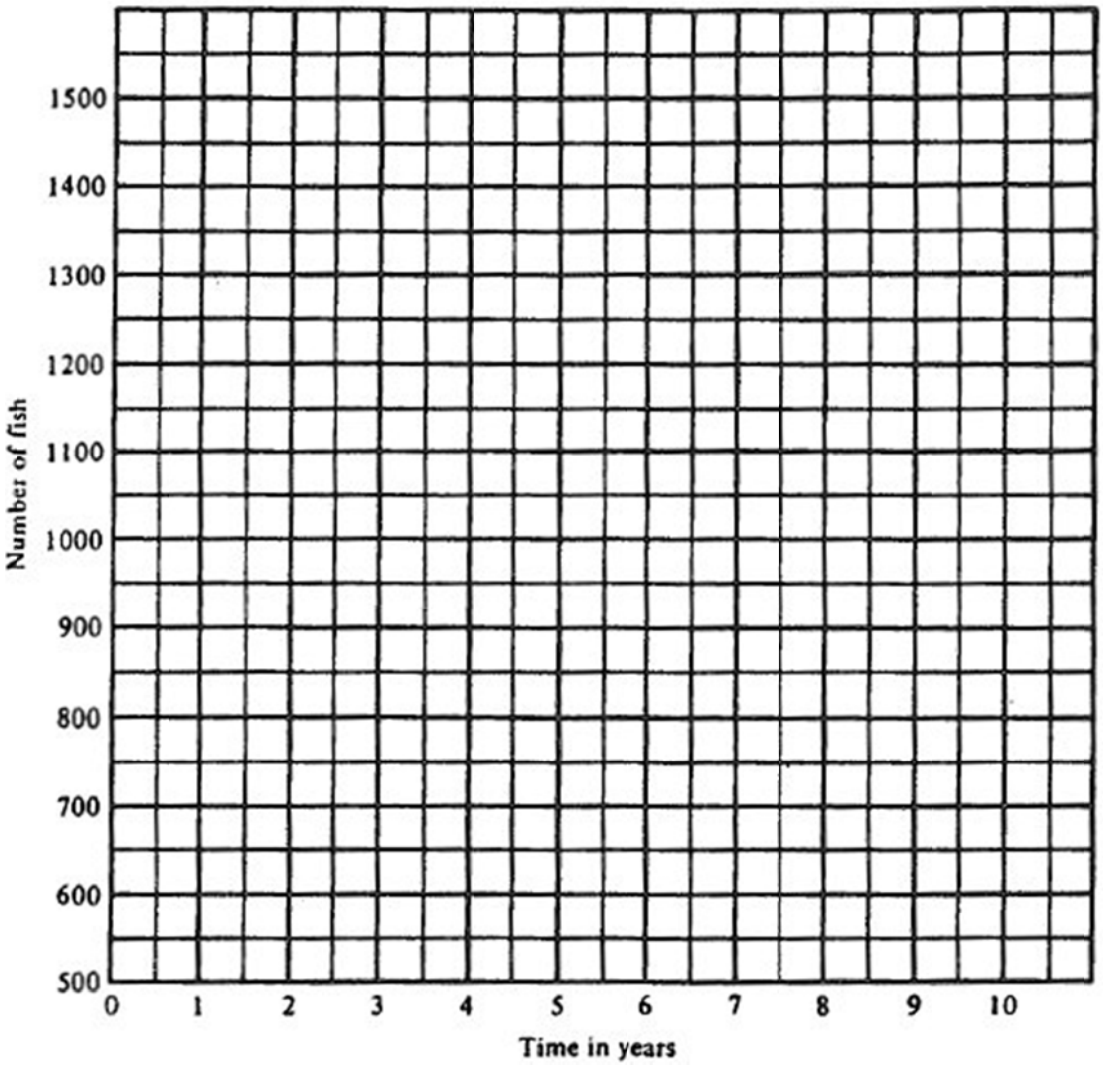
_____

_____

12. If a field of grass has 10,000 kCalories tied up in its tissues, approximately how much energy would be expected in the secondary consumers found in the field?

13. A stock pond was stocked with fish with initially with 580 bluegill fish fingerlings. Bluegill fish usually reproduce first as yearlings and regularly thereafter. The number of the fish in the pond was recorded for the next eleven years.

Year Stocked	Number of Fish
1	580
2	600
3	750
4	1200
5	1400
6	1460
7	1450
8	1440
9	1460
10	1450
11	1460
12	1450



Graph the population of fish on the graph shown.

14. What type of growth occurred between the first and fourth years?_____

_____

15. What type of growth occurred is shown by the entire graph?_____

_____

16. Determine the rate of increase from one year to the next year?

17. What year shows the greatest population increase?_____

18. What factors might be involved in the slowing of the population growth?_____

_____

_____

19. What is the approximate carrying capacity of the pond?_____

_____

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1	580	
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5	1400	
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7	1450	
8	1440	
9	1460	
10	1450	
11	1460	
12	1450	