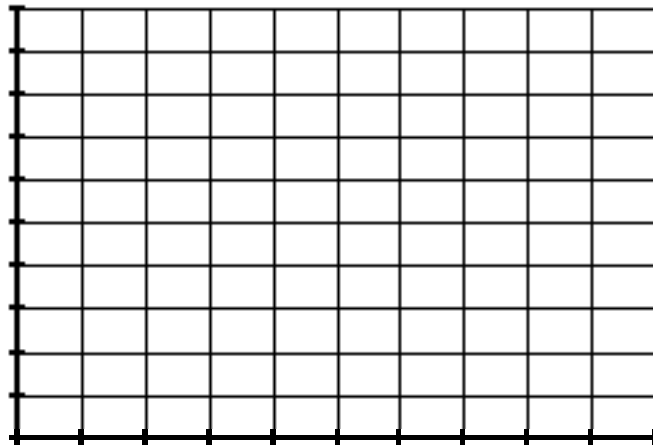


1. A Central Valley farmer stocked his farm pond with 1000 fathead minnows to raise as bait. Fatheads usually reproduce first as yearlings and regularly thereafter. The farmer recorded the number of fish each year for 10 years. He obtained the following data:

Year	Number of fish
0	1000
1	750
2	580
3	600
4	750
5	1200
6	1400
7	1460
8	1440
9	1450
10	1460



- Plot these data on a graph.
  - Mark the area on the growth curve where the rate is greatest.
  - Mark the point at which the farmer should begin fishing if he wants to maintain his population.
  - Why did the population decline during the first two years?
  - What was involved in slowing the population growth from the sixth year on?
  - Is the fathead minnow a K-strategist or an r-strategist?
2. Suppose that a fox feeds only on rabbits, squirrels, mice, and seed-eating birds, all of which feed on plant material. How many square meters of plant material are then required to support the fox if the net primary productivity of the plant material is 8000 Kcal/m<sup>2</sup>/year? Assume that the fox's daily caloric requirement is 800 Kcal, and that only 10% of the energy at one trophic level can be passed on to the next. If the fox were to feed only on insect-eating birds, how many square meters of plant material would be required?
3. Looking at these data, write a paragraph describing how you would improve the living conditions in developing countries. Gross national product (GNP) is the total, annual market value of a nations goods and services.

	Afghanistan	Japan	Somalia	United States
GNP (US\$)	220	25,430	150	22,450
US\$ spent on food, clothing, goods, recreation/person/yr	100	13,650	1,700	14,630
Mortality rate, %	20.0	6.7	18.1	8.5
Literacy rate, %	29.4	100	54.8	95.5
Pop. doubling time (yrs)	29	>100	24	88
Food, % recommended minimum	91	125	81	138
Energy consumption (kw-hr/person)	68	6,944	31	12,147
Electricity capacity (x1000 kw)	494	194,763	60	775,396
Fossil fuel use, % of total electricity	32.3	65.0	100.0	70.8
Population with access to safe water, %	21	98	35	100.0