

CB 17 My Family in 100 Years

How quickly will families grow if there are different number of children born each generation and different times at which the females begin having children? Which will contribute most to the growth of a family over a century: the number of children born each generation or the age at which the female first has children?

Materials (per student group)

- large graph or poster paper
- water-soluble marking pens
- meter stick
- 2000 data from www.prb.org
- Casio fx2 Graphing Calculator
- Casio QV2800 Digital Camera

Procedure

Compute the number of female children each generation for your assigned family for the generation interval nearest to 100 years. For this model, we will only count the female children that are born, since it is only the females who can give birth to descendants. Thus our model will represent a "depressed" count of the descendants, since we will not be counting the male descendants. Graph your data for a presentation to the class. Elect a member of your group to present the data. Take a digital image of your graph.

Assumptions for Various Families

Family	Assumptions
Asano	The Asano family lives in the suburbs and averages two female children per generation. The women have their first child at age 25
Brown	The Brown family lives in a metropolis and averages one female child per generation. The women have their first and only child at age 35.
Norako	The Norako family lives in a large city and averages three female children per generation. The women have their first child at age 15.
Ruppert	The Ruppert family lives in a rural area and averages three female children per generation. The women have their first child at age 20.
Ortiz	The Ortiz family lives in a college town and averages two female children per generation. The women have their first child at age 20.

Interpretations and Applications

1. How does the number of descendants in your assigned family compare to those of the other families after 100 years.
2. Which appears to have a greater impact on the final population size of a family: the number of children in each generation or the time between generations. Support your answer with data.
3. Go to www.prb.org to find data which might offer possible reasons why human populations in various parts of our world appear to be growing quickly. What appear to be other variables contributing to potential overpopulation?

CASIO FX 2.0 CALCULATOR PROCEDURES FOR CB 17

Making a Graph

To make a graph of the family growth, press the grey [MENU] key and choose [2] for STAT. If List1 and List2 are not clear, highlight any item in the list and press [F4] for DEL-A and then [EXE] for Yes. In List1 you will enter the generation years from 0 (the beginning) up to or slightly beyond 100. In List2 you will enter the number of females born to the family during all the generations over approximately 100 years.

- ☞ To enter the generation years in List 1, you must first determine what they will be. The first year for each family will be year 0 and you will only count the female ancestor that year, so all tables will begin with 0 in List 1 and 1 in List 2. The age at which the women have their first child is the length of the generation span, so the next entry after 1 in List 1 will be the age of the mother when she has her first child. The next entry will be twice that number, and the next entry three times that number and so on, until you reach 100 or go slightly beyond it. Be sure to press [EXE] after each entry for List1. For example, if women from the Lei family have their first child when they turn 18, then the entries in List 1 for the Lei family's generation years would be 0, 18, 36, 54, 72, 90, 108. Note that your generation years will be different since the age of the mother in your example when she has her first child is different from the 18 years used in this example.
- ☞ In List2, across from each generation year, you will enter the number of female descendents that will be born to the mothers during that generation. For example, if the Lei family averages 4 females each generation, then the first ancestor will have 4 females during that 18 year generation. During the next 18 year generation, listed as 36 in the table, those 4 females will each have 4 females of their own, for a total of 16 females. Those 16 females then will each have 4 daughters of their own during the next generation for a total of 16x4 or 64 daughters. If you continue with this pattern the entries in List 2 would be 1, 4, 16, 64, 256, 1024, 4096. Note that your numbers will vary since the number of females born each generation is different from the example of 4 that was used here. Don't forget to press [EXE] after each entry.
- ☞ Once you have entered all the data into both lists, if the bottom of the screen does not have GRPH as a choice and pressing [F6] does not produce that choice, then press [ESC] to return to the main List screen and menu choices. Press [F1] for GRPH and [5] for Set.
- ☞ Choose StatGraph1 by pressing [F1]. Cursor down to Graph Type.
- ☞ Choose Scat by pressing [F1]. Cursor down to XList.
- ☞ Press [F1] for LIST, then [1] and [EXE]. Cursor down to YList.
- ☞ Press [F1] for LIST, then [2] and [EXE]. Cursor down to Frequency.
- ☞ Press [F1] for 1. Cursor down to Mark Type.
- ☞ Choose the mark type you prefer by pressing the appropriate function key. Press [ESC] to return to the main screen.
- ☞ Press [CTRL] [F3] and be sure the Stat Wind is set to Auto. If it is not press [F1]. Press [ESC] to return to the main screen.
- ☞ Press [F1] for GRPH, then [1] for S-Gph1.