Chem assignment

The study of age-structured populations Lab Preparation: Read the lab and be on time. There will be a quiz. Also, we'll be riding a bus to the field location. If you want to Join us for lab, don't miss the bus! Bring your lab manual, a hard notebook or clipboard, paper and charcoal (for rubbings) and wear warm, possibly waterproof clothes. We'll be outside for a good portion of the lab regardless of the weather. Background: Demography Demography is the descriptive study of biological populations, including human populations.

Demography includes the study of birth rates, death rates, immigration, and emigration patterns (sometimes referred to as vital statistics). Ecologists have perfected the analysis of demography because the vital statistics of a population tell us if the population is growing or declining, what will be the stable age distribution of the population, and how selection might work on individuals of each age class. Today we will be looking at human demography. Humans experience age-structured population growth, meaning birth rates and death rates depend on the age of the individual.

In previous models we assumed that birth rates and death rates are constant, now we will incorporate age-structure to estimate generation time (G), intrinsic rate of increase (r), and net reproductive rate (OR). Human population dynamics can be particularly interesting because of how events or trends in human history affect them. Everyone has heard the term " Baby Boomers," which refers to the generation that was born after WI when the economy was strong and soldiers returning from the war were getting married or were reunited with their spouses.

This socio-political-economic event is observable in records of human populations IA increased birthrate, life expectancy, increased total population, and changes in sex ratios in countries affected by the war. Other global events that are evident in population data are the flu pandemic of 1918 which killed between 50 and 100 million people in only 18 months. In the US, this was followed shortly by the Great Depression, which added to the dip in population. There are many such events in human history that have impacted populations, some global and some local.

An event that changes a particular population could be as seemingly insignificant as the losing of a mine in a small West Virginia town or increasing housing prices in inner city Boston. Advances in healthcare have also significantly altered demographics in populations. In the early sass's it is reported that one of every five women died during childbirth and infant mortality was much higher than it is today. Obviously childbirth is not nearly as fatal today. These changes have been at least partially attributed to medical breakthroughs such as the discovery of antibiotics in the sass's and the polio vaccine in the sass's.

Today we will be looking at local demographics and population dynamics by electing information from tombstones. From this information we will be able to identify some basic population data as well as compare characteristics of age- classes or " cohorts. " For our graveyard study, our age-classes will consist of 10-year intervals populated by data from gravestones. We will be investigating the hypothesis that there are differences in survivorship of individuals who lived in the 19th century (1801-1900) compared to individuals who lived in the 20th century (1901-2000).

We will also be examining the data to see if sex plays a role in survivorship both as a whole and between the two time periods. Survivorship Curves Survivorship curves are representations of population mortality over a lifespan. There are three common forms that these curves can take that represent different life strategies. Different survivorship curves represent the different breeding strategies of organisms. It’s easy to forget that demography includes all biological populations, not Just humans.

In Figure 1, line I represents a type I population that experiences little mortality until old age. Species that follow this type of curve often have few offspring and provide parental care for the younger age classes. Large animals and ones in the higher atrophic levels such as lions, whales and apes often exhibit type I survivorship. Human populations also have survivorship curves that appear most like l. However, these curves are not absolute, imagine how a human survivorship curve would differ from curve I in areas with high infant mortality?

In contrast, species that exhibit type Ill survivorship often produce many offspring with little or no parental care in the hope that a few will survive to adulthood. Some examples of these types of species might include organisms such as octopi, which an lay up to 200, 000 eggs. Survival curves can also be calculated for plants and are most often described by a type Ill curve. Maple trees for example can drop thousands of seeds of which only a handful may ever make it to reproductive maturity. I Age (x) Figure 1. Survivorship Curves Types l, II and Ill.

In (IX)BOOK 102 Lab, Fall Page 3 of 5 Type II survivorship as seen in Figure 1 is characterized by near constant mortality over all age classes. Obviously, there are few species that exhibit strictly one type of survivorship but instead are somewhere between type I and Ill. Today we will be working in a local cemetery. I’m sure you don’t have to be reminded, but cemeteries are places of honor for those who went before us. Please remember to show respect for the dead and for any other people who may be visiting the cemetery while we gather the data.

Please respect the privacy of any people visiting graves by avoiding those areas. Objectives: 1) Collect data and learn to describe age-structured populations. 2) Compare and explain differences in the survivorship curves and life-tables in a community with respect to sex and historical trends.) Consider forces that shape human populations and how this compares to other age-structured populations. Graveyards Graveyards are interesting in themselves because they reflect social change and attitudes toward death.

Prior to the Revolutionary War era, such as some in Boston, gravestones were decorated with grinning skulls and cross-bones and stressed man’s inevitable fate. Cemeteries were muddy and unkempt, reinforcing this grim message. By the late sass’s, death was viewed more as a release from earthly suffering and white marble, a symbol of purity, became common for grave markers. They were often shaped like headboards of beds and the size indicated the age of the deceased. In the sass’s cemeteries began to be run by towns rather than churches and it became necessary to buy plots.

Grave markers became more ornate and for wealthy families, mausoleums were in vogue. By the late sass's family memorials had a central marker for the head of the family (an adult male), with smaller stones around it representing family members. At this time one out of five women died during childbirth and many children died before the age of five. Thus, death in the immediate family was fairly frequent. Because cemeteries held those recently dead individuals, families would often make weekend excursions to the cemetery and took along picnic lunches.

The atmosphere of graveyards reflected such social patterns and were groomed for a park-like effect. During this century the trend is for husband and wife to have equal and side-by-side headstones stressing the marital bond, rather than the supremacy of the father. I'm sure you don't have to be reminded, but cemeteries are places of honor for those who went before us. Please show respect for the dead and for any other people who ay be visiting the cemetery while we gather data. Specifically, respect the privacy of any people visiting graves by avoiding those areas.

At the Graveyard Work in pairs to collect data in the area of the graveyard you are assigned. Using Worksheet 1, record year of birth, death, and age of death for as many individuals as you can in the amount of time allowed. Use extra sheets of paper as needed. Indicate the sex of each individual (so that you will be able to examine if there are differences between male and female survivorship). BOOK 102 Lab, Fall Page 4 of 5 Data collection " best practices" for this lab: * If name is ambiguous to sex, omit that individual. Be sure not to focus exclusively on large tombstones, since this is influenced by wealth and will bias the data by introducing differences in quality of health

care. * Choose data for individuals who lived primarily in one century or the other to avoid categorical ambiguity. * If the name on a gravestone is illegible, make a rubbing using blank paper and the side off dark crayon. Rubbings can greatly enhance legibility. Assignment This lab is to be the basis of a short write-up worth 10 points. Follow your Task instructions for formatting the write-up.

You will need to specifically address two questions as part of your write-ups discussion to get full credit: 1) Compare the OR, G, and r-values you calculated for each century and for each gender. What biological mechanism(s) may cause these values to differ? 2) Which survivorship schedule curve does your data most closely match? Are the survivorship curves different between centuries? Between genders? What biological, historical, or cultural mechanism(s) could explain the patterns you observe in your data?