Kearny High School- APES Chapter #4- Guided Viewing Botkin & Keller- 8th Edition

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Learning Objectives: The human population has been growing rapidly for centuries. What is happening and, most important, what will happen to all of us and our planet if this continues?
After reading this chapter, you should understand that . . .
* Ultimately, there can be no long-term solutions to environmental problems unless the **human population stops increasing;**
* Two major questions about the human population are (1) what controls its rate of growth and (2) how many people Earth can sustain;
* **Modern medical practices and improvements in sanitation, control of disease-spreading organisms, and supplies of human necessities** have lowered death rates and accelerated the net rate of human population growth;
* Although the death rate has declined, so **more people live longer,** the rapid increase in the human population has occurred with little or no change in the maximum lifetime of an individual, which is still less than 120 years;
* In general, countries with a high standard of living have moved more quickly to a lower birth rate than have countries with a low standard of living;
* Although we cannot predict with absolute certainty what the future **human carrying capacity** of Earth will be, an understanding of human population dynamics can help us make useful forecasts;

1: List the symptoms and vectors (how spread) of the following disease:
*** H1N1 (Swine Flu):** flu symptoms (sneezing, coughing, etc); human contact
*** West Nile Virus:** fever, headache, rashes; mosquitoes
* **SARS** (Severe Acute Respiratory Syndrome): fever, cough, shortness of breath; human contact through transportation

2: Why are diseases that affect humans **expected to increase** in the future?
-Because of population growth, new settlement areas, and disease organisms that evolve to resist medicine.

3: **Define the following:**
* Population Dynamics: The general study of population changes
* A Population: A group of individuals of the same species living in the same area or interbreeding and sharing genetic information
* Species: All individuals that are capable of interbreeding, and so a species is composed of one or more populations

* Demography: The statistical study of human populations, and people who study the human population include demographers

4: What are the **5 key properties** of any population?
-Abundance, birth rates, death rates, growth rates, and age structure

5: What are the **4 phases of the human population**?
-Stage 1: Period of hunter-gatherers, pop. <1 mil
-Stage 2: Rise of agriculture, major pop. increase
-Stage 3: Industrial revolution, improved living conditions, growth rate increased but varied
-Stage 4: Industrialized countries slow down pop. growth, less developed nations grow

6: Define the following terms:
* Crude Birth Rate: Number of births per 1,000 individuals per year, age structure not taken into account
* Crude Death Rate: Number of deaths per 1,000 individuals per year
* Crude Growth Rate: net number added per 1,000 individuals per year; crude birth rate minus crude death rate
* TFR (Total Fertility Rate): Average number of children expected to be born to a woman throughout her child-bearing years
* Doubling Time (define and calculate?): Number of years it takes for a population to double, assuming a constant rate of natural increase (2 x time)
* Life Expectancy Rate: Average number of years a newborn infant can expect to live given current mortality rates
* GNP Per Capita: Gross national product, includes value of all domestic and foreign output

7: What is the **S-shaped or Logistic Growth Curve**?
-The curve that is believed to represent human population trends in the future, when Earth reaches near its carrying capacity

8: Explain this equation: $\mathbf{P}2 = \mathbf{P}1 + (\mathbf{B} - \mathbf{D}) + (\mathbf{I} - \mathbf{E})$
-Equation used to determine population change (population equals births minus deaths, plus immigration minus emigration)

9: Explain this equation: $g = (B - D)/N$ or $g = G/N$
-Equation to determine growth rate (growth equals birth minus death, divided by N)

10: What does an **age-structure pyramid** show?
-A population dominated by younger individuals and a high death rate, but also a high birth rate. Signifies a rapidly growing population with a short average lifetime

11: Summarize (one paragraph) The Prophecy of **Thomas Malthus**:
-Malthus's prophecy stated that a population cannot thrive and rapidly grow with a finite resource base, and that it would be impossible to maintain a population in this situation. He theorized that death is vital to maintain population levels, and that without premature deaths, the population would become unstable. However, he assumed that technology would remain the same, and the timing of collapses. With modern technology, we can still maintain the Earth's population to prevent it from exceeding the Earth's carrying capacity.

12: What is the **demographic transition**?
-A three-stage pattern of changes in birth and death rates that have occurred during development in Western nations. Population growth declines as a result.

13: What is the difference between a **maximum lifetime and life expectancy**?
-Maximum lifetime is how long an individual is able to live for. Life expectancy is the average number of years that an individual is expected to live to (maximum could be 100, but people in the US are suspected to die at around 80)

14: Which country has the **highest life expectancy**? **Who is 2nd**?
-Macau; Japan

15: What is the life expectancy of the United States?
-78 years

16: Which country has the **shortest life expectancy**?
-Swaziland ☹

17: When discussing the **carrying capacity of the Earth-** What are the:
*** Short-Term Factors:** The factor that affects the year in which it limits
*** Intermediate-Term Factors:** Factors that show symptoms after 1 year, but before 10
*** Long-Term Factors:** Factors that show after 10 years

18: Explain how the carrying capacity of the Earth is a combination of science and of values.
-Carrying capacity is determined by raw requirements based on calculations of resource usage and growth (science) and what constitutes healthy, desirable living conditions (values)

19: What is the **simplest and most effective means** of slowing population growth?
-Delay the age of first childbearing

20: Three characteristics of a population are the birth rate, growth rate, and death rate. **How has each been affected** by (a) modern medicine, (b) modern agriculture, and (c) modern industry?
A) Modern medicine has changed rates by motivating scientists and pharmaceutical companies to produce medicine that fights diseases and prevents unwanted childbirth.
B) Modern agriculture has changed the rates by abundance and surplus, which helps nourish countries with high growth rate and birth rate. It also varies depending on a country's rates.
C) Industries have changed by providing ease for citizens in countries, giving them less problems to worry about and less risks to take in obtaining supplies.

21: What is meant by the statement "What is good for an individual is not always good for a population"?
-An individual may be living in a highly desirable situation, but their surplus most likely affects other people in need that do not have good living conditions, which could affect populations that suffer from similar problems.

22: What environmental factors are likely to increase the chances of an outbreak of an epidemic disease?
-Environmental factors such as decreased living space and increased pollution and waste could increase outbreak chances.

23:What is the **demographic transition**? When would one expect replacement-level fertility to be achieved—before, during, or after the demographic transition?
-A three-stage pattern of changes in birth and death rates that have occurred during development in Western nations. Population growth declines at the end. One would expect replacement-level fertility to occur after demographic transition.

24: Based on the history of human populations in various countries, **how would you expect the following to change** as per capita income increased: (a) birth rates, (b) death rates, (c) average family size, and (d) age structure of the population? **Explain.**
A) I expect birth rates to increase in developing countries and decrease in developed countries due to industrialization. Developed countries will have lowered birth rates because of contraception and control.
B) Death rates will decrease (but possibly increase due to funds) worldwide because of rising availability of medicine.
C) Average family size will decrease in developing countries due to developmental links to extended families (more developed countries have more nuclear families).
D) Age structure will shift towards having more elderly than young people due to increased life expectancy and lower birth rates because of contraception/birth control.