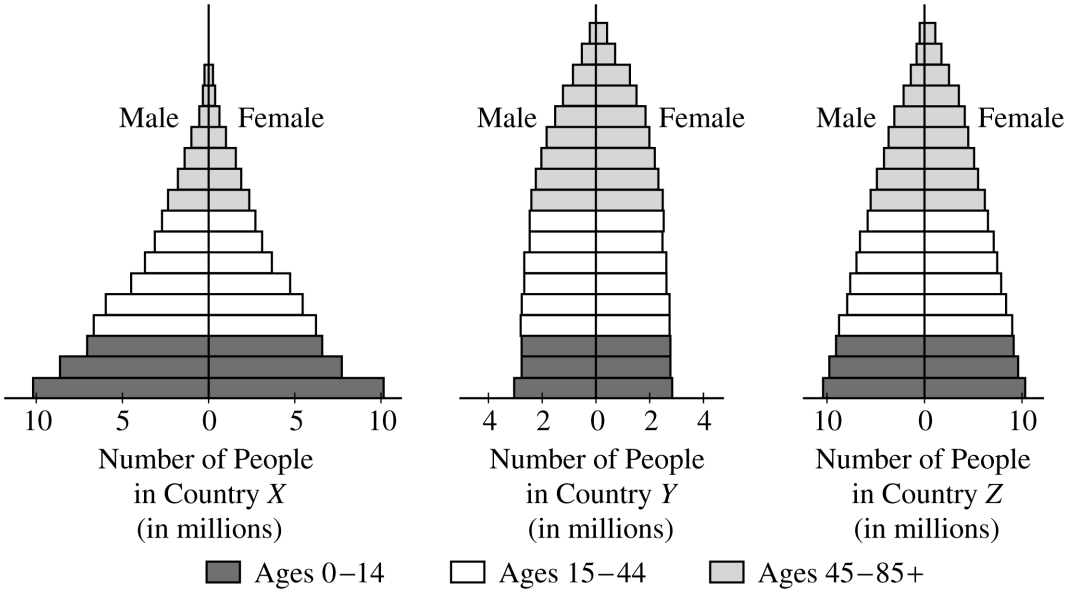

4. The figures above show the age structures of human populations in three countries, *X*, *Y* and *Z*.

   (a) Which of the three countries has the largest rate of population growth? Which has the smallest rate? Explain.

   (b) Compare the infant mortality rates that are likely in Countries *X* and *Y*. Explain your reasoning.

   (c) Describe the changes in both the birth rate and the death rate for a country making the transition from a preindustrial society to an industrial society.

   (d) Describe one incentive that the government of a country could offer its citizens that would favor a reduction in the growth rate of its population. Explain how this incentive would work, and describe one possible drawback.

END OF EXAMINATION

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AP® Environmental Science 2000 – Scoring Standards

Question 4 Scoring Guide

(a) Comparing Population Growth Rates (3 POINTS MAXIMUM)

1 point earned for naming *X* as the country with the largest rate of population growth

1 point earned for naming *Y* as the country with the smallest growth/replacement level fertility

1 point earned for a statement explaining why country *X* has the largest growth rate *and/or* country *Y* has the smallest growth rate (only *first* explanation is graded)

Example: A relatively large segment of the population of country *X* is currently in the **prereproductive/reproductive years** and will soon begin having children (giving the population momentum). In contrast, the prereproductive cohorts in county *Y* are about equal in size to the reproductive and postreproductive cohorts. (Country *Y* exhibits zero population growth/reaches recruitment.)

Notes of things to look for:
- Broad base and pyramid shape indicative of large rate of population growth (population momentum, reproduction, etc.)
- Compare cohort ages of the lower cohorts (must include prereproductive/reproductive or population momentum idea)
- Mere description of the histogram itself earns no credit

(b) Infant Mortality Rates (2 POINTS MAXIMUM)

1 point earned for stating that country *X* has a higher infant mortality rate than country *Y*, or that country *Y* has a lower infant mortality rate than country *X*.

1 point earned for explanation

Examples of accepted explanations:
- Larger drop in population from one cohort to the next in bottom of histogram of country *X*
- Little change in cohorts on histogram of country *Y*
- Country *Y* probably is an industrialized/developed country (MDC), which usually has a lower infant mortality rate
- Country *X* probably is an unindustrialized/developing country (LDC), which usually has a higher infant mortality rate
- Infant mortality is lower in country *Y* due to, for example,
  - uncontaminated drinking water
  - better nutrition
  - better health care
  - education of women
- Infant mortality higher in country *X* due to, for example,
  - contaminated drinking water
  - poor nutrition
  - poor health care
  - few or no educational opportunities for women

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(d) (*continued*)

1 point earned for explaining how the given incentive works to reduce growth rate of population

Examples of Explanations Accepted:

- Government provides free education for mother of 0-1 children. This enables the mother to get a better job and make more money. Studies show as women have higher education and better jobs, they tend to have fewer children, thus lowering the population growth rate.
- Government will give free health care to families of 0-1 children. They can then get the necessary medical care to keep that child alive and healthy, as well as themselves. This raises their quality of life and may be a strong incentive to have 0-1 children, thus lowering the population growth rate.

1 point earned for a rational drawback that follows up on the incentive given (acceptable incentive must be given to earn a point for drawback)

Examples of Drawbacks Accepted:

- Cultural/social issues in countries
- Interference with religious teaching
- Children punished for actions of parents
- Fewer workers to support an aging population/fill jobs/military strength
- Cost of programs to government and citizens
- Difficulty of dissemination of information/enforcement of regulations
- Rewards likely to attract people who already have all the children they want
- Reduced tax revenues
- Civil unrest
- Emigration/immigration with explanation on why a drawback
- Infringement of human rights
- May not work in rural or other areas because of need for child labor
- Increased government spending and debt leading to inflation
- Decreased quality of life for family without children
- Child dies (tied back to incentive)
- Increase in number of abandoned children/orphans
- Consequences/punishment for multiple births (e.g., twins)
- Increase in STDs, unwanted pregnancies, etc., that may accompany free birth control

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