**METHOD**

In small groups, students explore changes in regional fertility rates and life expectancy trends over time and discuss how factors impacting fertility are different throughout the world. Students then conduct individual research on a single country to evaluate development and place it within the demographic transition model. Finally, the class explores how countries within the same DTM stage compare.

**INTRODUCTION**

As human populations have developed and grown over time, there has been a steady increase in life expectancy and global population. In fact, starting in the 1900s humans experienced a dramatic drop in death rates and increase in life expectancy, which is largely attributed to factors such as new technologies in agriculture and production, advances in health and sanitation, and lower infant mortality. However, there are drastic differences globally in the quality of life indicators that impact fertility rates and life expectancy. As the global population is projected to be greater than 11 billion by 2100, we need to understand what factors impact lower fertility rates and increased life expectancy.

Parts 1, 2, and 3 are in-class activities. Part 4 begins with an out of class research assignment and ends with an in-class activity after the homework has been completed.

**MATERIALS**

- Student Worksheet
- Region Cards
- Demographic Transition Model graphic
- Student Assignment sheet
- DTM signs (Stage 2, Stage 3, Stage 4, Stage 5)

**CONCEPT**

We live in a demographically divided world with large disparities in population growth rates and the quality of life indicators that impact those growth rates.

**OBJECTIVES**

Students will be able to:

- Analyze the history of life expectancy and fertility rates to understand present trends.
- Compare/contrast regions of the world according to indicators of human quality of life.
- Describe the structure of the demographic transition model.
- Research and evaluate human well-being within a country based on quality of life indicators.

**SUBJECTS**

AP Human Geography, World Geography

**SKILLS**

Classifying historic events, identifying trends, analyzing data, applying academic knowledge to real world events, research, defending conclusions
PART 1
Understanding Regional Trends Through Time

Between 1950 and today, population growth and quality of life have changed throughout the world. But these changes have occurred at different rates and at different times, and future changes will also not be uniform.

Procedure:
1. Define:
   - **Fertility Rate**: The average number of children a woman will have in her lifetime
   - **Life Expectancy**: The average number of years a person born today could expect to live under current death rates. Your own life expectancy changes as you grow older, and as you face different risks.

2. Divide students into small groups to cover the six regions of the world (Africa, Asia, Europe, Latin America, Northern America, and Oceania) and provide each group access to www.WorldPopulationHistory.org

3. Distribute the Student Worksheet and review the directions.

4. Give students 10-15 minutes to complete the worksheet for their region. When all groups are finished, each group presents its findings to the class.

PART 2
Understanding Quality Of Life Indicators

Preparation, before class:
Cut out the six Region Cards and in large print, write the name of each region on the back of its card.

Procedure:
Many factors impact the number of children a woman will bear and an individual’s life expectancy. These quality of life indicators are complex and differ significantly in some cases, depending upon the region of the world.

1. Choose one representative from each of the six groups from Part 1 (Africa, Asia, Europe, Latin America, Northern America, and Oceania).

2. Give each representative their Region Card and ask that that they hold it up so the rest of the class can see the region name. Explain that the statistics being discussed represent averages for each region. As they observed on the overlay maps at www.WorldPopulationHistory.org, there are significant variations among the statistics within regions.

3. Have representatives line up in order of fertility rate (lowest to highest) so that students have a baseline view of the current regional averages. Give students a few seconds to record the order on their own paper.

4. The Region Cards contain four factors that impact the fertility rate. For each of the indicators, conduct the following:
   a. Discuss what the factor is and how it impacts fertility rate.
      • Percentage of girls (ages 10-15) not in school: Percentage of females ages 10-15 that are permanently out of school
      • Infant mortality rate: Infant deaths per 1,000 births
      • Adolescent fertility rate: Births per 1,000 women ages 15-19
      • Percentage of female contraceptive use: Percentage of women using any method, modern or traditional, of contraception
   b. Decide if a lower or higher statistic is beneficial for the region.
   c. Have students arrange themselves from least ideal to most ideal based upon the discussion and the statistics from the Region Cards.

5. Project the Fertility Rates Overlay for the year 2015 and go over Fertility Rate Discussion Questions.

6. Have representatives line up one last time based on the Life Expectancy (lowest to highest) and have students note the order.
7. Have each representative go back to their regional group and brainstorm factors that impact life expectancy. After a few minutes, create a list or web on the board that includes points from each group’s discussion. (Possible factors include: access to healthcare; infant mortality; access to nutrition; improved sanitation; clean water; control of infectious diseases; workplace safety)

8. Project the Life Expectancy Overlay for the year 2015 and go over the Life Expectancy Discussion Questions.

Fertility Rate Discussion Questions:
1. How did the order of the regions change for each of the four indicators on the Region Card?

Overall, the more developed regions of the world (Europe, Northern America, Oceania) have higher levels of education for women, lower teen birth rates, higher availability of birth control and health care, and lower infant mortality rate. Less developed regions (Africa, Asia, Latin America) are where we see fewer years of education for women, higher teen birth rates, less availability of family planning, and a higher infant mortality rate.

2. The Region Cards and our volunteers showed us four factors that influence fertility rates. Can you think of others?

Possible answers include: the need for children in the labor force; the cost of raising children; access to health care/level of health care; availability of employment for women; availability of legal abortions; religious beliefs, traditions, or cultural norms.

3. Which regions of the world have high levels of variation in fertility rates?

The most apparent region is Africa, which has fertility rates that range from 2 to 7+. Sub-Saharan Africa and Madagascar have some of the highest fertility rates in the region, whereas the more developed countries in the south (Botswana, Namibia, Zambia, and South Africa) and in the north (Morocco, Algeria, Libya, and Egypt) have lower fertility rates.

In Asia, we see low fertility rates in East Asia and higher rates in countries with political instability, including Afghanistan and Iraq.

Life Expectancy Discussion Questions:
4. What is the difference in life expectancy between Northern American countries and many parts of Africa? Which of the ideas that you brainstormed could lead to such a drastic difference?

The developing regions of sub-Saharan Africa often have low access to health care, lack of proper nutrition, and a lack of health and sanitation that accompany high rates of poverty. Sub-Saharan Africa also has some of the highest rates of HIV/AIDS along with civil and political unrest, both limit life expectancy.

5. Why do Canada, Western Europe, Australia, Japan, and Chile have the highest life expectancy rates?

These areas have universal access to clean water and improved sanitation, and universal access to health care that is largely government subsidized.

PART 3
The Demographic Transition Model
If your students have a firm grasp of the demographic transition model (DTM), you can skip Part 3.

Procedure:
1. Display www.Gapminder.org/world. Gapminder is a free site that uses the latest statistical data to create interactive, graphical representations of data over time. The video “Wealth and Health of Nations” should open automatically.

2. Change the axes on the graph by using the arrow buttons on each axis to select: Population > Population Growth > Crude Death Rate (y axis) and Crude Birth Rate (x axis).

3. Define:
   Death Rate: Annual deaths per 1,000.
   Birth Rate: Annual births per 1,000.
Note: Birth rate is not the same as fertility rate, which has previously been discussed.

4. Play the video and as the bubbles move, ask students what regional variations they see in birth and death rate?

Overall, the death rates decline over time, which means people are living longer and healthier lives. However, there are differences in birth rate depending on the region of the world. The more developed nations have the lowest birth rates, whereas the least developed countries have the highest birth rates.

5. Move the cursor over several bubbles and ask students to identify what is happening in each country. Find the United States and look at the birth and death rates. Compare countries from opposite parts of the graph. For example, compare Niger or Afghanistan which are at the right end of the graph (highest birth rate and higher than average death rate) to Japan or Hong Kong which are at the bottom left (lowest birth rate and lower than average death rate).

6. Project the Demographic Transition Model graphic and briefly review that the DTM uses the birth rate and death rate to categorize countries into stages of development. The five stages include:
   • Stage 1: High Fluctuating. Birth and death rate are both very high.
   • Stage 2: Early Expanding. Birth rate remains high. Death rate is falling. Population steadily rises.
   • Stage 3: Late Expanding. Birth rate begins to fall. Death rate continues to fall. Population still rising.
   • Stage 4: Low Stationary. Both birth and death rate are low. Population is now beginning to steady or plateau.
   • Stage 5: Low Declining: Birth rate falls below death rate. Population begins to decrease.

7. Go over Discussion Questions.

Discussion Questions:
1. What is the main take-away from this model?

As countries’ birth rates and death rates decline they advance in the stages of the DTM.

2. Can you see any limitations of the model?

The model assumes that in time all countries pass through the same stages. However, due to political unrest and economic stressors it seems that some countries, especially in sub-Saharan Africa, might not become industrialized in the same manner as many of today’s developed countries.

The timescale of the model is also now different for rapidly developing regions of the world, such as Hong Kong and Malaysia, because they develop much faster than early industrialized countries.

PART 4
Understanding Regional Variation & Complexity

While it can be a useful tool, the demographic transition model does have limitations. Consider that it divides all the countries of the world, home to over 7 billion people, within just four groups. As such, within each group, or stage, there is variation in regards to quality of life, future challenges, and much more.

Procedure:
1. Without providing the demographic transition model stages, assign students a country from the following list. Go over the questions on the Student Assignment sheet and have students complete it as homework.

<table>
<thead>
<tr>
<th>Country</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niger</td>
<td>Stage 1</td>
</tr>
<tr>
<td>Guatemala</td>
<td>Stage 2</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>Stage 1</td>
</tr>
<tr>
<td>Brazil</td>
<td>Stage 4</td>
</tr>
<tr>
<td>United States</td>
<td>Stage 4</td>
</tr>
<tr>
<td>China</td>
<td>Stage 4</td>
</tr>
<tr>
<td>India</td>
<td>Stage 3</td>
</tr>
<tr>
<td>South Africa</td>
<td>Stage 3</td>
</tr>
<tr>
<td>Columbia</td>
<td>Stage 3</td>
</tr>
<tr>
<td>Germany</td>
<td>Stage 5</td>
</tr>
<tr>
<td>Japan</td>
<td>Stage 5</td>
</tr>
</tbody>
</table>
2. In class the following day (or after homework is completed): On the board, create four columns for each of the DTM stages being discussed. Make sure to leave room for notes.

<table>
<thead>
<tr>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
<th>Blank space for teacher notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries:</td>
<td>Countries:</td>
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<td>Countries:</td>
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<tr>
<td>Similarities:</td>
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<td>Differences:</td>
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</tr>
</tbody>
</table>

3. Hang the four DTM signs (Stage 2, Stage 3, Stage 4, and Stage 5) around the room and ask students to stand under the sign representing where their country fits into the DTM. Do a quick check to ensure that the correct countries are in each group.

4. Within the DTM groups, give students a few minutes to discuss their findings and determine whether there are any trends in their research. What quality of life indicators are similar? What is different? Are they located close to each other geographically?

5. Record their findings on the board. If there is not adequate board space, have students take notes.

6. Lead the class in a discussion about their observations. What trends do we notice in each of the stages of the DTM? Did anything surprise you? How will improving the quality of life in countries in Stage 2 and 3 lead to reduced birth rates? Knowing what you learned from research, do you feel that the demographic transition model works today?

ASSESSMENT

Completed Student Worksheets can be used as an assessment. Additionally, assess how well each student prepared for the DTM class discussion. Did they find relevant information to answer the questions on the Student Assignment sheet? Were they able to justify their country’s DTM stage and compare/contrast it with other countries in the stage?