



## **The Population Explosion: Causes and Consequences**

Curriculum Unit 98.07.02  
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### **INTRODUCTION**

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The rapid growth of the world's population over the past one hundred years results from a difference between the rate of birth and the rate of death. The human population will increase by 1 billion people in the next decade. This is like adding the whole population of China to the world's population. The growth in human population around the world affects all people through its impact on the economy and environment. The current rate of population growth is now a significant burden to human well-being. Understanding the factors which affect population growth patterns can help us plan for the future.

The purpose of this unit is to examine some important factors about overpopulation. This unit addresses: (1) the definition of overpopulation (2) the causes of rapid population growth, (3) the consequences of rapid population growth, and (4) actions and strategies that can be developed to solve problems caused by overpopulation.

This unit consists of core knowledge about the causes and consequences of overpopulation, lesson plans, teacher resources, student reading list, a list of speakers and a bibliography. Although this unit is intended primarily for students in grades 5-8, teachers in both elementary and high school can use this unit to explore key ideas and concepts about the population explosion.

### **THE DEFINITION OF OVERPOPULATION**

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In the past, infant and childhood deaths and short life spans used to limit population growth. In today's world, thanks to improved nutrition, sanitation, and medical care, more babies survive their first few years of life. The combination of a continuing high birth rate and a low death rate is creating a rapid population increase in many countries in Asia, Latin America and Africa and people generally lived longer. Overpopulation is defined as the condition of having more people than can live on the earth in comfort, happiness and health and still leave the world a fit place for future generations.<sup>1</sup> What some people now believe that the greatest threat to the future comes from overpopulation.

It took the entire history of humankind for the population to reach 1 billion around 1810. Just 120 years later,

this doubled to 2 billion people (1930); then 4 billion in 1975 (45 years). The number of people in the world has risen from 4.4 billion people in 1980 to 5.8 billion today. And it is estimated that the population could double again to nearly 11 billion in less than 40 years. <sup>2</sup> This means that more people are now being added each day than at any other time in human history.

Looking ahead, world population is projected to exceed 6 billion before the year 2000. And according to a report by the United Nation Population fund, total population is likely to reach 10 billion by 2025 and grow to 14 billion by the end of the next century unless birth control use increases dramatically around the world within the next two decades.<sup>3</sup>

Both death rates and birth rates have fallen, but death rates have fallen faster than birth rates. There are about 3 births for each death with 1.6 births for each death in more developed countries (MDCs) and 3.3 births for each death in less developed countries (LDCs). The world's population continues to grow by 1 billion people every dozen years.<sup>4</sup>

On one hand, some politicians call for countries, especially MDCs to increase their population size to maintain their economic growth and military security. On the other hand, critics denote that one out of five people living here today is not properly supported and believe that the world is already limited in resources.

These critics maintain that slowing world population growth is one of the most urgent issues. Those who believe that the world is overpopulated argue that if we don't sharply lower birth rates, we are raising death rates by default.<sup>5</sup>

## **THE CAUSES OF RAPID POPULATION GROWTH**

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Until recently, birth rates and death rates were about the same, keeping the population stable. People had many children, but a large number of them died before age five.<sup>6</sup> During the Industrial Revolution, a period of history in Europe and North America where there were great advances in science and technology, the success in reducing death rates was attributable to several factors: (1) increases in food production and distribution, (2) improvement in public health (water and sanitation), and (3) medical technology (vaccines and antibiotics), along with gains in education and standards of living within many developing nations.<sup>7</sup> Without these attributes present in many children's lives, they could not have survived common diseases like measles or the flu. People were able to fight and cure deadly germs that once killed them. In addition, because of the technology, people could produce more and different kinds of food. Gradually, over a period of time, these discoveries and inventions spread throughout the world, lowering death rates and improving the quality of life for most people.<sup>8</sup>

### **Food Production Distribution**

The remarkable facts about the last 150 years has been the ability of farmers to increase food production geometrically in some places. Agricultural practices have improved in the United States in the last two centuries. Much of the world experienced agricultural success, especially in the last 50 years. Between 1950 and 1984, for example, the amount of grain harvested worldwide increased from 631 million tons to 1.65 billion tons. This represents a gain of 2.6 times at a time when the world population increased by only 1.9 times.<sup>9</sup>

In more recent years, the technology has produced a broader variety of techniques: new kinds of seed, chemical fertilizers, pesticides, and more sophisticated machinery. The use of technology has made possible the rapid expansion of agriculture in the United States and other MDCs and LDCs. The use of pesticides in LDCs, for example was expected to increase between 400 to 600% in the last 25 years of the twentieth century. 10

During the past 10 years, the world's food production has increased by 24 per cent, outpacing the rate of population growth.<sup>11</sup> However, this increase was not evenly distributed throughout the world. For example, in Africa, food production decreased, while population increased. And world cereal production fell in 1993, according to the FAO, which predicted a food shortage in 20 countries during 1994. <sup>12</sup> However, most experts agree that there is no shortage of food, and that equitable distribution should be sufficient to meet all needs for the future. Lack of money to buy food is the problem of malnourishment. Poverty, in effect translates the world adequacy into national and local shortages. Within households, men and boys have priority for whatever food is available, while women and children, especially girl children are the first to suffer malnutrition. Few resources are available to women, even though they are often responsible for food supply.<sup>13</sup>

### **Improvement in Public Health**

People have concerns about surviving daily living, such as meeting basic needs: food, water, and housing. First, access to safe drinking water was related to the incidence of epidemic diseases such as cholera and child survival. Less than 50% of the population had access to safe drinking water before 1990. By 1990, access to safe drinking water had increased by 75 per cent. But between 1990 and 2000 the numbers of people without access to safe water are projected to increase. <sup>14</sup> An increasing number of countries both developed and developing are approaching the limits of sustainable water use based on their own renewable resources.<sup>15</sup>

Second, the pressure to provide adequate housing increases as the population grows. More than half of the developing world's population will be living in urban areas by the end of the century. This growth outstrips the capacity to provide housing and services for others. In some countries, finding a place to live is hard, especially for women. Some women and children are forced to live in the poorest community where they are open to exploitation and abuse.<sup>16</sup>

The priorities for getting rid of poverty, improving food supply, ending malnutrition, and providing adequate housing coincide at all points with those required for balanced population growth.

### **Conquest of Disease**

The biggest population story of the last hundred years has been the conquest of disease. Scientists have learned a great deal about the ways to prevent and cure many types of disease. Thus, millions of people who would have died of disease a century ago are more likely to live to old age. The most effective tools in the conquest of disease have been improved knowledge about nutrition, vaccinations, better public health practices and the development of new medicines<sup>17</sup>

In the late 80s, a baby born in Iceland was 32 times more likely to live to the age of one year as a baby born in Afghanistan.<sup>18</sup> The major reason for this large difference in survival rate is nutrition. When young children get enough of the right kinds of food, they are likely to live to be adults. In many nations the people know about proper nutrition for young children and adults. Unfortunately, in many LDCs the people lack the money and skills that would allow them to use the knowledge about nutrition they already have. As a result, infant

death rates and therefore, overall death rates, remain high in many LDCs. 19

The second most important factor is vaccinations. As far back as 1800, scientists knew how to use vaccines to protect people from infectious disease. Use of that knowledge has reduced the rate of diseases like influenza, smallpox, polio and rubella in MDCs. Again, lack of resources has prevented many LDCs from making similar use of vaccinations to reduce the rate of infectious disease and death rates in their countries. Moreover, vaccines are still not available for some diseases—malaria is the most obvious example and the greatest concern in LDCs.<sup>20</sup>

Third, better public health practices-- the germ theory of disease, discovered by Louis Pasteur in the 1870s clearly demonstrated that a person's health was also a community problem. Sewage dumped into a public water supply could cause disease throughout the community. With this understanding, the science of public health was born. Today, public health measures like waste treatment, water purification, vaccination, and nutritional education are well developed in MDCs. However, public health measures are still absent in many LDCs. As a result, disease continues to spread and cause high death rates.<sup>21</sup>

And finally, with the advent of new medicines, disease was less of a problem in MDCs because medical science has invented a whole range of new medicines with which to treat everything from infections to pneumonia. In many LDCs, new drugs and medicines are simply not available. 22

As stated earlier, death rates in MDCs have fallen largely because of improved health and medical knowledge and because of better health and medical practices based on that knowledge. Death rates in many LDCs remain high because the money, personnel and facilities needed to put that knowledge into practice are not available.<sup>23</sup>

Progress in medical science has, therefore, had a great effect on the population of most nations of the world. Nearly everywhere death rates have fallen. At the same time, birth rates, at least in the LDCs, have remained high. This combination of high birth rates and low death rates have led to the population explosion in many countries throughout the world.

The end of the population explosion worldwide will be determined by how much countries invest in family planning efforts to lower fertility and slow down population growth.

Different populations grow at different rates around the world. This depends on how many children families have and the number of years someone is expected to live. The population of many countries in Asia, Africa and Latin America are growing the fastest, especially where large families are still important. These poorer, less developed countries (LDCs) tend to have shorter lives and higher infant death rates. When couples know some of their children may die, they choose to have more. However, many couples wish to limit family size, but lack the information and means to make these choices. 24

## **THE CONSEQUENCES OF RAPID POPULATION GROWTH**

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Rapid human population growth has a variety of consequences. Population grows fastest in the world's poorest countries. High fertility rates have historically been strongly correlated with poverty, and high childhood mortality rates. Falling fertility rates are generally associated with improved standards of living, increased life expectancy, and lowered infant mortality. Overpopulation and poverty have long been

associated with increased death, and disease. 25 People tightly packed into unsanitary housing are inordinately vulnerable to natural disasters and health problems.

However, most of the world's 1.2 billion desperately poor people live in less developed countries (LDCs). 26 Poverty exists even in MDCs. One in five Soviet citizens reportedly lives below the country's official poverty line. In the United States, 33 million people - one in eight Americans are below the official poverty line. The rapid expansion of population size observed since the end of World War II in the world's poorest nations has been a cause of their poverty. 27

Poverty is a condition of chronic deprivation and need at the family level. 28 Poverty, is a major concern of humankind, because poverty everywhere reduces human beings to a low level of existence. Poor people lack access to enough land and income to meet basic needs. A lack of basic needs results in physical weakness and poor health. Poor health decreases the ability of the poor to work and put them deeper into poverty.

Instead of allowing poverty to persist, it is important to limit our number because in dense populations too many lack adequate food, water, shelter, education and employment. High fertility, which has been traditionally associated with prosperity, prestige, and security for the future, now jeopardizes chances for many to achieve health and security. 29

Rich and poor countries alike are affected by population growth, though the population of industrial countries are growing more slowly than those of developing one. At the present growth rates, the population of economically developed countries would double in 120 years. The Third World, with over three quarters of the world's people, would double its numbers in about 33 years. This rapid doubling time reflects the fact that 37 percent of the developing world's population is under the age of 15 and entering their most productive childbearing years. In the Third World countries (excluding China), 40 percent of the people are under 15; in some African countries, nearly half are in this age group. 30

The world's current and projected population growth calls for an increase in efforts to meet the needs for food, water, health care, technology and education. In the poorest countries, massive efforts are needed to keep social and economic conditions from deteriorating further; any real advances in well-being and the quality of life are negated by further population growth. Many countries lack adequate supplies of basic materials needed to support their current population. Rapid population growth can affect both the overall quality of life and the degree of human suffering on Earth. 31

## **ACTIONS AND STRATEGIES THAT CAN BE DEVELOPED TO SOLVE THESE PROBLEMS**

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There is controversy over whether population growth is good or bad. Over-population and continuing population growth are making substantial contributions to the destruction of Earth's life support systems. In the past, human populations have rarely been subject to explosion. In numbers. The powerful long-term momentum that is built into the human age structure means that the effects of fertility changes become apparent only in the future. For these reasons, it is now conventional practice to use the technology of population projection as a means of better understanding the implications of trends.

Population projections represent the playing out into the future of a set of assumptions about future fertility

and mortality rates. More public education is needed to develop more awareness about population issues. Facts like the size or the growth rate of the human population should be in the head of every citizen. Schools should inform students about population issues in order for them to make projections about the future generations.

Action plans and strategies can be developed to increase public understanding of how rapid population growth limits chances for meeting basic needs. The spirit of open communication, and empowerment of individual women and men will be key to a successful solution to many population problems. Collective vision about health care, family planning and women's education at the community level build a basis for action. The creation of action plans help to meet challenges to find cooperative solutions. Free and equal access to health care, family planning and education are desirable in their own right and will also help reduce unwanted fertility.

Individual choice, human rights and collective responsibility are key to allowing families to plan the size and spacing of their children. It is essential to achieve a balance between population and the available resources. Teachers, parents, community workers and other stakeholders should extend the range of choices about available resources to individuals, especially women, and by equalizing opportunities between the genders from birth onwards.

Teachers, parents, other educators, politicians and other concerned citizens can practice how to make good decisions in everyday life. Decisions about family size, and resource will affect the future generations. Through community forums, specific issues about the population growth can be discussed and possible action plans can be developed.

Teachers, as well as students can use the information super highway to gain knowledge about other countries' population and resources. Teachers can help students with problems and decision making on a daily basis. The investigation of world population will raise the level of awareness, so that we can learn to handle problems based on data. This data can help us to analyze our situations in a practical way.

Teachers, students, parents and other stakeholders can look for trends in the population explosion. They can hold community meetings at school to discuss how this issue presents a challenge to the big picture of human population on the planet "Earth".

## Lessons Plans

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This year the ideas that I present for lessons plans will involve several hands-on activities that will promote problem solving and critical thinking skills.

### Lesson Plan I

Overview: The purpose of this lesson is to illustrate the concept of population growth rate.

Material Needed: World Population Data Sheet to find the birth and death rates.

Do This: Ask what is the birth rate for the world? And what is the death rate?. Have students find growth rates for two different countries or regions.

## Lesson II

Population growth occurs when the birth rate exceeds the death rate. Tell students worldwide, the human birth rate is currently three times the death rate

### Concept

This activity demonstrates the relationship between birth and death rate and of population growth within a finite space.

### Procedure:

1. Fill a bucket with water and add food coloring so it will be more visible in a clear container. Place the empty, clear container with the towel under it in front of the class.
2. Ask for two volunteers from the class to assist. Designate number 1 for one student and number 2 for the other. Each student should tape the appropriate number tag to the student.
3. Hold up the clear container: This will represent the world, and the colored water in the bucket will represent people. Number 1, will add people to the world by pouring dippers of water into the container. Number 2, will be taking people from the world by scooping water out of the clear container and pouring it back into the bucket. At this time, the world's birth rate is three times the death rate. Based on that fact, who should receive the large dipper? Who should use the small dipper?

### Discussion:

1. Why did the water level rise steadily
2. What would this mean if the clear container really was the world?

Source: People and the Planet, Zero Population growth, Inc. Wash., D. C. 1996.

## Lesson Plan III

Overview: In a society where tradition often clashes with modern ideology, decision making may be taxing.

Goal: To act out the decision making process of a married couple in an urban area in Connecticut discussing

whether or not they will add another child to their family.

Objective: student will (1) discuss attitudes affecting family size in Connecticut; (2) make a decision after listening to opinion.

Skills To Be Developed

1. Role Playing

2. Persuasive speaking

3. Problem Solving

Do This:

Read students a scenario that describes a specific situation involving a decision concerning family size in Connecticut. Choose six students to be the participants in the role playing activity. Select three males and three females and give each student a description of their character. All students who are not role players will pretend that they are the couple who must make the important decision about whether or not to have another child. Poll the students. Did you choose to have another child? Why or why not? What if any particular argument, was the most important in affecting your decision?

#### **Lesson Plan IV**

Concept:

Human population has a variety of consequences, both direct and indirect. One of the consequences easiest to see in our daily life is crowding. With population growth, the average population density will increase. For example, in your three room house an increase from 3 children to 4 children can make a difference. This means that you will need to share your space with other members of your household.

Discussion: talk about the pros and cons of adding an addition to the household.

1. What are the consequences of adding new members to your family?

2. What are the benefits?

Procedure:



Have student imagine that the number of students in your classroom has doubled. Have them list the effects of this. Make sure that both positive and negative impacts are discussed. Have students vote by secret ballot on whether they would like to have more, fewer or the same number of students in the class as they have now. Tally and announce the results to the class.

Questions:

1. What services are easier to provide for an area of high population density?
2. What qualities are desirable about areas of lower population density?
3. If population continues to grow locally, what is the impact on population density?

Source: People and the Planet, Zero Population Growth, Inc: Wash, D. C., 1996

### **Lesson Plan V.**

Here's Your Dilemma:

You love children and would like to have a large family. You are aware, however, that the world's population is expected to double in the coming century. You are also aware of the financial and environmental cost of a large family. What would you do and why? Would you:

1. plan to have a large family
2. decide not to have children
3. limit yourself to one or two children
4. get involved with youth groups scouts, tutoring, teaching, etc. emergency foster care, to still be around groups of youngsters.

## 5. Others

### Population Reference Chart

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#### POPULATION GROWTH

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#### TIME INTERVAL # OF YEARS WORLD POPULATION

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00\_1850 MILLIONS 1 Billion

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1850-1930 80 2 Billion

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1930-1975 45 4 Billion

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1975-1987 12 5 Billion

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1987-2000 15 6 Billion

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\*We currently are adding 90 million annually and will continue to do so through 2015.

### Teacher Reading List

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Hare, W. P.(1996) A New Look At Poverty in America. This report explodes many common myths about America's nearly 40 million poor: who they are how they differ from other Americans, how long they stay poor, and how dependent they are on welfare. Falkenmark M. And Widstrand, C. (1992) Population and Water sources: A Delicate Balance. While the world's fresh water supply is limited, human need for water continues to increase due to rapid population growth and expansion of irrigation and industry. Bender, W. and Smith, M. (1997) Population, Food and Nutrition. The world produces enough food for produce enough to feed future generations? This bulletin explores the factors that determine both the demand for and supply of food worldwide. The author also investigate ways to increase yields and discuss constrains on production. [Teacher's Resource List](#)

Crews, K. and Pollard, K. (1998) United States Population Data Sheet. This wall chart is a state-by-state rundown of population

size, density, and other demo-graphic indicators. It also highlights the impact of population on the environment by presenting information for all states and the District of Columbia on energy con-sumption, solid waste per capita, wetlands loss, endangered animal and plant spe-cies, land under environmental protection, and toxic air pollutants released per cap-ita. Wolfgang, L. (1994) The Future of World Population. Population can follow many scenarios as we head into the 21st century. This report looks at possible trends in future fertility, mortality, and migration in major world regions. Zero Population Growth (ZPG) Selected Resources on Population. This comprehensive bibliography of information sources related to population and the environment includes books, bulletins, software, films and teaching materials. Student Reading List

ZPG, Popular Planet Press. This children's newsletter includes articles, fun facts, games and "tales from the people planet" to show kids the links between population growth and our environment. Published three times each year, popular Planet Press welcome submissions from children. #PPP Free. Speakers and Other Resources

YNHTI Curriculum Units on "The Population Explosion" (1998).

Units and author's name will be on the "Web " in the Fall of 1998.

## Bibliography

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Corson, W.H. (1990) The Global Ecology Handbook. What You Can Do About the Environmental Crisis, Boston: Beacon Press.  
Ehrlich, P. & Ehrlick, A (1990) The Population Explosion. New York: Simon and Schuster Miller, T.G. (1992) Living In The Environment. Belmont, Calif. : Wadsworth, Inc. pp. 4-29 Miller, T. G. (1995) Environmental Science: Working With The Earth. Belmont, Calif: Wadsworth, Inc. pp. 130-60 Newton, D. E.(1992) Population: Too Many People. Library of Congress, U.S .A. Sadik, N. (1995) The State Of World Population. New York: United Nation Population Fund.

Wasserman, P. (1996) People and the Planet: Lessons for a Sustainable Future. Wash, D. C.: Zero Population Growth, Inc.

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