A Quick Trip to 7 Billion: Where Do We Grow From Here?

Introduction:
The charts and graphs on the “Where do we grow from here” side of the poster show some of the ways that our human numbers are straining our ability to depend on the natural resources that support our most basic needs. Overall, we are healthier, wealthier, and better educated than ever before, yet there are still great challenges ahead for our global family. We continue to deplete our natural resources at an unsustainable rate, nearly half of us still live on less than $2 a day and our population is expected to continue growing through much of this century. However, there are things that can be done to help stabilize our population, protect the global environment and promote human dignity and well-being. In this activity, students will think critically about how our human numbers have shaped the world around us and how our actions will impact our future growth.

Materials:
Computer with Internet access
“A Quick Trip to 7 Billion” e-poster
Student Worksheets (“Where do we Grow From Here” and “7 Billion Solutions - What Can be Done?)

Part 1: Where do we Grow From Here?
Procedure:
1. Direct students to our website, www.Worldof7Billion.org/teacher-resources/wall-chart. Allow students time to read the information, interpret the charts and graphs, and answer the questions on the student worksheet.

2. Go over the answers as a class and discuss the following questions:

   a. Why do you think per capita consumption of meat has increased over the years? Do you think the demand will continue to increase? Why or why not? What might be the environmental impacts of more or less meat consumption in the future?

   Answers will vary. Per capita meat consumption has increased, in part, because more people can afford to eat more meat. Generally, as income rises, so does meat consumption. This is likely to continue as emerging economies produce a larger middle class. Environmental impacts of meat consumption include: clear-cutting forest for pastures and cropland to grow feed; greenhouse gas emissions (methane), fertilizer and pesticide runoff, and water use to raise cattle and grain for feed (it’s estimated that about half of all clean water worldwide is used to raise livestock).
b. The per capita use of paper and paperboard has steadily increased. What factors might have led to this increase and do you think this trend will continue? What might this mean for the future?

*Answers will vary. An increase may be the result of more global industry, an increase in overall global wealth and consumerism has led to more packaging. With more people using electronic media, we may see a decline in this trend in the future.*

c. Dead zones occur in highly populated coastal areas, which is where there is also the highest concentration of aquatic life. What human behavior has led to the increase in the number of dead zones over the years? What do dead zones mean for aquatic life?

*While dead zones can occur naturally, most of the dead zones in the world today are the result of human behavior. Dead zones can be caused by use of fertilizers and pesticides, as well as runoff from sewage and urban land use. Fish, crabs, and clams cannot live in dead zones.*

d. The spike in the number of malnourished people in the world in 2009 was a result of an increase in food prices around the world. What events or situations might cause food prices to rise? Could we prevent this from happening again? How?

*Food prices might rise if there is a drought, or other natural disasters that limit crop production. Food prices can also be affected by oil prices - when oil prices spike, the cost of fertilizers, food production, and food transportation increases, leading to an increase in price. Students might also mention the use of crops for biofuels, like ethanol. Answers will vary regarding if and how we could prevent a spike in food costs in the future.*

**Part 2: 7 Billion Solutions: What Can be Done?**

**Procedure:**

In this portion of the activity, students brainstorm what can be done on both a global and local scale to help stabilize global population.

1. Give each student a copy of the worksheet, “Where do we grow from here?”

2. Divide students into small groups (4 or 5 students per group) and assign each group one of the 4 questions to work on (you may have multiple groups working on the same question - that’s okay). This will be their “Expert Group,” meaning they are all “experts” on this question.

3. As they answer the question, students should share ideas and keep notes. Each student in the group is responsible for recording the answers as they will need to be able to share their answers with others.

**After all groups are finished with their question:**

3. Instruct students to form new groups that consist of at least one person from each Expert Group (one person from Question 1, one person from Question 2, etc.) This new group will be their “Sharing Group.”

4. Have students take turns sharing and discussing the answers to their questions in their new group. Students should record the answers that are shared within the group.
QUESTION 1:
The UN estimates that world population will be over 10 billion by 2100. How might your life or your children’s lives be different if this is true? What advancements do you think would have to be made in education, medicine, environmental issues, and food and water supply in order to support a global community of 10 billion people? What about 15.8 billion?

We will live in a more crowded world and we will have to share our resources even more than we do today. There will be a greater risk of civil conflict as a result of resource competition, a risk of progressing climate change along with its environmental implications, and greater risk of food and water shortages. Students may mention the need for better distribution of food and clean water, more efficient growth of food (using less water and/or land), more equitable food distribution, use and development of renewable energy sources, medical advancements in immunizations and sanitation.

QUESTION 2:
What might influence which population projection we end up with in 2100?

Most of our population growth today is occurring in developing countries. Our projection will depend on our ability to bring down the birth rates in these countries. It will also depend on the trends in more developed countries – will countries that have reached replacement level fertility continue to have 2-child families?

QUESTION 3:
Most population growth today is happening in less developed countries where birth rates are high. Look at the graphs for the UN’s three scenarios of population growth and the information in the “What Can be Done” and “Demographic Tale” sections of the poster. Based on this information, what do think we could do as a global society to help slow population growth in developing countries?

Our ability to improve the living conditions in these developing countries will dictate our future growth. Educating women, increasing life expectancy, decreasing infant mortality rates, and providing access to comprehensive family planning will all help to stabilize our population growth.

QUESTION 4:
Research and discuss ways that YOU can be a part of the solution. Looking at the poster, can you think of things that you and the people in your community could do to help slow population growth in developing countries and ensure that Earth’s finite resources will be able to support our global family?

Answers could relate to supporting micro-lending projects that allow more children (especially girls) to attend school, supporting organizations that encourage family planning, learning about projects related to increased food production/distribution and water sanitation, discussing the issues surrounding population growth with your friends and family, being conscientious of your energy use and using renewable energy wherever possible, cutting back on your meat and paper consumption.
Go to our website, www.Worldof7Billion.org/teacher-resources/wall-chart. First, read through the text and interpret the charts and graphs. Based on the information on the poster, work individually or with a partner to answer the following questions.

1. Look at the diagram of the Demographic Transition Model. Countries in Stage 1 have little to no population growth. Why is this true? Looking at Stage 2, we see high birth rates and falling death rates, leading to population growth. What might cause a country’s death rate to decrease?

2. Look at Stage 3 of the Demographic Transition model. What is happening to birth rates? What might explain this?

3. Look at the graphs for paper and meat consumption. How might these graphs be related to the increase in ocean dead zones, and to the depletion of Caribbean coral reefs and tropical rainforest?

4. In 2005, about what percent of the current population was under moderate water shortage? What percent was under extreme water shortage? Why might an increasing population lead to a higher percentage of our global population facing chronic water shortage?

5. Look at the graph titled, “Energy Use Uneven Across the Globe.” What trends do you notice? How much more energy does the average North American consume versus an average Bangladeshi?

6. Look at the graph titled, “Women’s Education and Fertility.” What can you tell about the relationship between women’s education level and fertility rates? What might be the reason for this?

7. Look at the graph for “Improving Child Health in Low Income Countries.” In recent years, we have seen the most gains in child health through an increase in vaccinations, while advancements in basic sanitation and access to clean water have only been modest. Do you think that there is a reason for this?
A Quick Trip to 7 Billion

Student Worksheet: 7 Billion Solutions - What Can Be Done?

What will you become the expert on? Circle one:

QUESTION 1:
The UN estimates that world population will be over 10 billion by 2100. How might your life or your children’s lives be different if this is true? What advancements do you think would have to be made in education, medicine, environmental issues, and food and water supply in order to support a global community of 10 billion people? What about 15.8 billion?

QUESTION 2:
What might influence which population projection we end up with in 2100?

QUESTION 3:
Most population growth today is happening in less developed countries where birth rates are high. Look at the graphs for the UN’s three scenarios of population growth, and the information in the “What Can be Done” and “Demographic Tale” sections of the poster. Based on this information, what do think we could do as a global society to help slow population growth in developing countries?

QUESTION 4:
Research and discuss ways related to this topic that YOU can be a part of the solution. Looking at the poster, can you think of things that you and the people in your community could do to help slow population growth in developing countries and ensure that Earth’s finite resources will be able to support our global family?

In your group, discuss the answer to the question you circled above. In the space below, record notes from your group conversation. You will share these notes with others in your next group. Feel free to conduct additional research to help you answer the question -- look at the “Research Resources” listed on www.Worldof7Billion.org under the Student Video Contest tab. Additional resources include: www.fao.org; www.who.int; and http://ngm.nationalgeographic.com/7-billion.

My Notes:
A Quick Trip to 7 Billion

Student Worksheet: 7 Billion Solutions - What Can Be Done?

In the spaces below, record the answers from the other experts in your group.

Question ___

Question ___

Question ___
Part 3: 7 Billion and Counting: Where do we grow from here?

1. In Stage 1 of the demographic transition model, birth rates and death rates are both high and therefore, there is no growth. Death rates may decrease because of advances in medicine and technology, access to better nutrition and improved sanitation.

2. Birth rates in Stage 3 are falling. As death rates fall (due to medical, technological or social advances), so do infant mortality rates -- children live longer as well. When babies are more likely to survive infancy, couples feel more comfortable having fewer children. Also, as countries industrialize and urbanize, fewer children are needed to work on family farms.

3. Tropical rainforests are being cut down as a result of increased meat demand, to make room for grazing cattle as well as crops like soy beans and corn that can be used for cattle feed. Pesticides and fertilizers are often used to grow the crops that feed cattle. The run-off from these farms flows into waterways where they deplete the oxygen that is needed to support aquatic life, creating dead zones. The decline in healthy coral reefs resulting from pollution and increased water surface temperatures can be linked to an increase in greenhouse gases in the air. Both meat production and paper production release large amounts of CO₂ into the atmosphere, thus indirectly impacting the health of our reefs and our oceans.

4. About 35% of the population lived under moderate water shortage. About 10% lived under extreme water shortage. An increasing population will need more water for domestic uses and for use in agriculture and industry.

5. High income countries historically use a disproportionate amount of energy and continue to do so today. There has been a slight increase in the amount of energy used by middle income countries since 1974. A North American uses 40 times more energy than a Bangladeshi, on average.

6. Countries with highly educated women have lower fertility rates and countries with less educated women have higher fertility rates. More educated women tend to stay in school longer, and get married later, thus having fewer children over the course of their lifetimes.

7. Answers will vary. Students may mention that vaccinations are easier to supply, require less infrastructure development, and perhaps receive more publicity than sanitation and water issues.