

ES20-HP1

Investigate technologies and processes used for mitigating and managing resource use, waste generation and pollution associated with a growing human population.

Indicators for this outcome

- (a) Identify factors that have contributed to historical and contemporary trends in human population growth and that may influence future growth. (K)
- (b) Investigate the environmental impact of human population changes over the last century on a specific region or area with respect to resource use, waste generation and pollution. (STSE, K)
- (d) Discuss the strengths and limitations of models (e.g., I=PAT) that scientists use to quantify the impact of population, consumption, technology and stewardship on the environment. (STSE, A)
- (e) Assess the impact of factors such as advances in food security and access to medicine that support a growing human population. (K)

Students will watch the BBC Documentary Film,
“How Many People Can Live on Planet Earth?”

<https://www.dailymotion.com/video/x7s8ybc>

Introduction

Describe how quickly the human population is growing, in **2 different ways**:

What is the greatest threat to human well-being, to other species, and the earth as we know it?

Section 1 (*After the Title*): Overview

Give **3 examples** of environmental problems where Human Population is a factor.

What is the purpose of the Optimum Population Trust?

Where is the data on almost every birth and death on Earth for the last 60 years kept? (Which division?)

How many people does the UN project we will have by 2050 (the middle of this century)?

How many teenagers are alive “today” (at the time the video was made)?

Which country is projected to become the most populous country in the world by 2050?

What are 2 examples of regions that are relatively undeveloped, but are expected to **double** by 2050?

Extending life by controlling _____ is perhaps one of the greatest achievements of humanity.

What was Thomas Malthus' major observation/principle about population? (summarize/paraphrase)

Think: How can NASA provide insights into understanding what a human needs to survive? How is this relevant to understanding the problems of population?

Section 2: Water

What are some of the ways we appropriate approximately half of the world's water for our own uses?

More than a billion people on earth already lack access to
_____.

Mexico City's water system is buckling under the pressure of supplying water to its _____ inhabitants.

How have people in Mexico City had to adapt their lifestyles to adjust to the water shortage there?

What are some of the insights offered by the water truck driver in the film?

The water we use at home is only part of the issue. What **two sectors** use colossal quantities of water?

How much water is required to make a cup of coffee?

A hamburger?

A shirt?

What has happened to the Aral Sea over the last 40 years?

What other lake had this same problem?

Desalination (distilling fresh water from the oceans) is an option that some countries have turned to. What are some downsides to this process?

Section 3: Food

Water shortages in the future will affect our ability to produce _____.

We are already using almost all of the really productive land for agriculture. In fact, we are already using _____ percent of the entire land surface of the earth to grow food.

Due to projected population growth, we need to _____ the amount of food available to us, as soon as possible. We can do that by _____, because there is really no more land to expand to.

In the 20th century, industrialized nations were able to _____ their productivity, due to:

Describe the Green Revolution, as started by Norman Borlaug:

We're beginning to see a levelling off of food production – this is leading to what worrying new trend?

Give some examples of these land deals:

Why is the future going to be particularly challenging for the countries in Sub-Saharan Africa?

Describe the situation with farmland in Rwanda:

In order to live sustainably, what needs to happen in industrialized countries?

According to David Attenborough (the narrator), what are the 3 ways we can achieve a reduction in our impact on the Earth?

Section 4: Birth Rates

Describe the One-Child Policy in China:

How many more people would there be in China without this policy?

How did the Indian government seek to reduce their population? What did they try and did it work?

Festivals & Incentives:

1977 Emergency Program:

How many people were sterilized in 1977 alone?

What is the main reason that Kerala (a state in India) has a stable population size? Why are people having smaller families than in other parts of India?

What is the average age of marriage for women in Kerala?

In other states in India?

What crucial technology is required for people to effectively manage the size of their families?

Give an example of a country in Africa where the government has made this technology a national priority. How has this worked?

How many births around the world are unplanned each year?

Section 5: Other ways to Reduce Impact on the Planet

What is being done around Mexico City to repair the ecosystem and the hydrological cycle?

Why do the local farmers call their forests “water forests”?