

Human Arrival and Expansion

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WHAT'S COVERED

This lesson will cover the topic of human arrival and expansion on earth. We will explore an overview of human history, human population growth, population explosion, and what has sustained human population growth. Specifically, this lesson will cover the following:

1. Earth's History in a Year: Human Arrival

As we discussed in an earlier tutorial, we're going to compress history into a year. This time, however, it's going to be just the history of Earth, not the history of the universe.

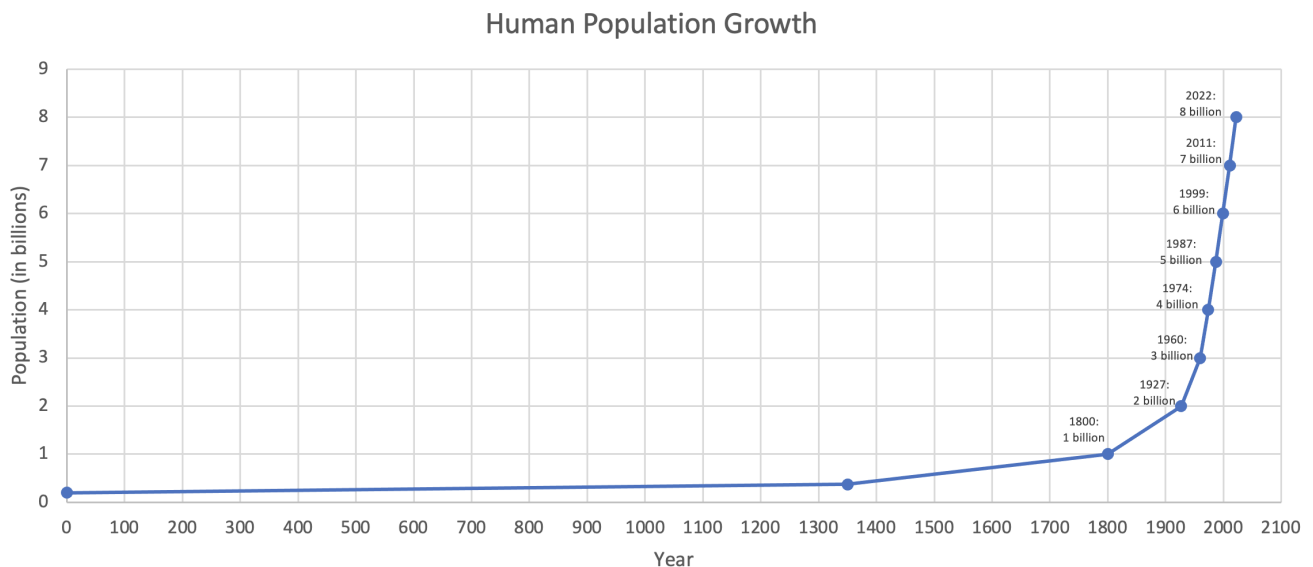
Consider the diagram of the yearly calendar below. Starting January 1st, 4.5 billion years ago, Earth was formed. 660 million years later, or by this scale, 11 months later, by mid-November, every major group of multicellular organisms had evolved. Human evolution began 5–8 million years ago, or somewhere between 9:00 AM and 2:00 PM on December 31st. Approximately 200,000 years ago, or at about 11:37 PM, December 31st, *Homo sapiens* evolved.



2. Human Population Growth

Over time, human behavior and skills have changed and evolved. During the Old Stone Age between 200,000 and 10,000 years ago, humans, or *Homo sapiens*, were hunter-gatherers. They often lived in small seasonally mobile tribes.

However, with the advent of agriculture approximately 10,000 years ago, the Neolithic era began. *Homo sapiens* became more sedentary, primarily shifting to farming and settled communities. The invention of agriculture, along with a host of technologies and practices that resulted, eventually gave rise to human population growth and expansion.



From about 200,000 BCE to about 8,000 BCE, human population remained relatively low. The Black Death and widespread famine reached their zenith around 1350. However, human population was still beginning to expand. As the Black Death and widespread famine receded, human population experienced continuous growth since 1350 and began to climb, reaching 1 billion only 450 years later. The population doubled to 2 billion in only 127 years, then grew to 3 billion, and then doubled again by 1999 to 6 billion.



THINK ABOUT IT

If you look at the addition of a billion people, it took 127 years the first time, 33 years the second time, 14 the third time, 13 the fourth time, 12 the fifth time, 12 the sixth time, and 11 the last time in 2022, bringing the world population to 8 billion. It is still climbing—how many years do you think it will take for the world population to reach 9 billion?

3. Human Population Explosion

Population growth really exploded following the beginning of the Industrial Revolution for several reasons, including the following:

- Population growth itself expanded cities and infrastructure
- The Industrial Revolution increased access to safe drinking water
- Cities allowed large amounts of energy to be centralized for human use

- New forms of transportation allowed people to become more mobile

The Industrial Revolution, combined with the Green Revolution in the mid-1900s, also increased food productivity and reduced famine drastically.

The Green Revolution was a combination of improved agricultural crop breeding, mechanization of farming, and chemical production of fertilizer. It increased the worldwide production of food crops, especially in developing nations.

Lastly, the Industrial Revolution reduced disease and increased longevity through improved nutrition, sanitation, and medicine.

4. Sustaining Human Population Growth

Human population growth has continued over time because of technological advancements in toolmaking.

➞ **EXAMPLE** The modern tractor, which increases productivity and decreases human labor requirements simultaneously, allows for increased food productivity, which can then support a larger human population.

Agricultural advancements, such as chemical fertilizers, have increased crop productivity by providing the nutrients needed quickly and with less human labor than before. This has also increased food productivity and allowed for a larger human population to thrive. In general, advances in agriculture and animal domestication have made it so that fewer people are needed to work to feed many people, which has in turn freed up other people's time and allowed them to specialize in other activities. This specialization allowed for more technological advancements to sustain human health, which has allowed for even more population growth.

In addition, technological advancements in industrialization, such as highly efficient manufacturing facilities, have generated goods and products that can preserve and protect human health, and are cheaper and more widespread. This also has allowed for a larger human population. In general, technological improvements have sustained human population growth because they have encouraged the following three things:

- **Increased fertility:** The average number of children born to a single woman has risen because of food availability and medical care.
- **Decreased infant mortality:** The rate of infant deaths per year has decreased because of better medical care and sanitation.
- **Increased longevity:** Human lifespans have increased because of better medical care, food production, and sanitation.



SUMMARY

In this lesson, we discussed the context of human beings on Earth. We explored **human arrival** in the context of Earth's history if it happened in a year. We also discussed **human population growth**, **human population explosion**, and what has **sustained human population growth** in general.

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