

# Population Growth



# WORLD POPULATION

Figures indicated by "UN estimate" are based on the July 1, 2009 estimate by the Population Division of the United Nations Department of Economic and Social Affairs.[4]

| Rank | Country       | Population    | Date Last Updated | % of World Population |
|------|---------------|---------------|-------------------|-----------------------|
| 1    | China[5]      | 1,336,070,000 | 2/27/10           | 19.63%                |
| 2    | India         | 1,177,592,000 | 2/27/10           | 17.3%                 |
| 3    | United States | 308,765,000   | 2/27/10           | 4.54%                 |
| 4    | Indonesia     | 231,369,500   | 7/09              | 3.4%                  |
| 5    | Brazil        | 192,540,000   | 2/27/10           | 2.83%                 |
| 6    | Pakistan      | 168,840,500   | 2/27/10           | 2.48%                 |
| 7    | Bangladesh    | 162,221,000   |                   | 2.38%                 |
| 8    | Nigeria       | 154,729,000   |                   | 2.27%                 |
| 9    | Russia        | 141,927,297   | 1/1/10            | 2.09%                 |
| 10   | Japan         | 127,430,000   | 2/1/10            | 1.87%                 |
| 11   | Mexico        | 107,550,697   | 7/1/09            | 1.58%                 |

# California

- 37 million people in 2009
- 3 million in San Diego County
- 60,000 in Encinitas
- Some Effects:
  - Most of the wetlands are gone - habitat encroachment
  - The number of endangered and threatened species is higher than any other state
  - Water shortages from droughts remains a long-term threat
  - Air pollution from cities costs California farmers \$100 million a year in damaged and lost crops

# More Effects

- Increased stress due to overcrowding can lower reproduction
- Increased disease

# What Affects the Growth of Population?

- Education: Higher education in developed countries result in decreased birth rates
- Children as a labor force: In developing countries, the birthrate is higher because children begin working at an early age

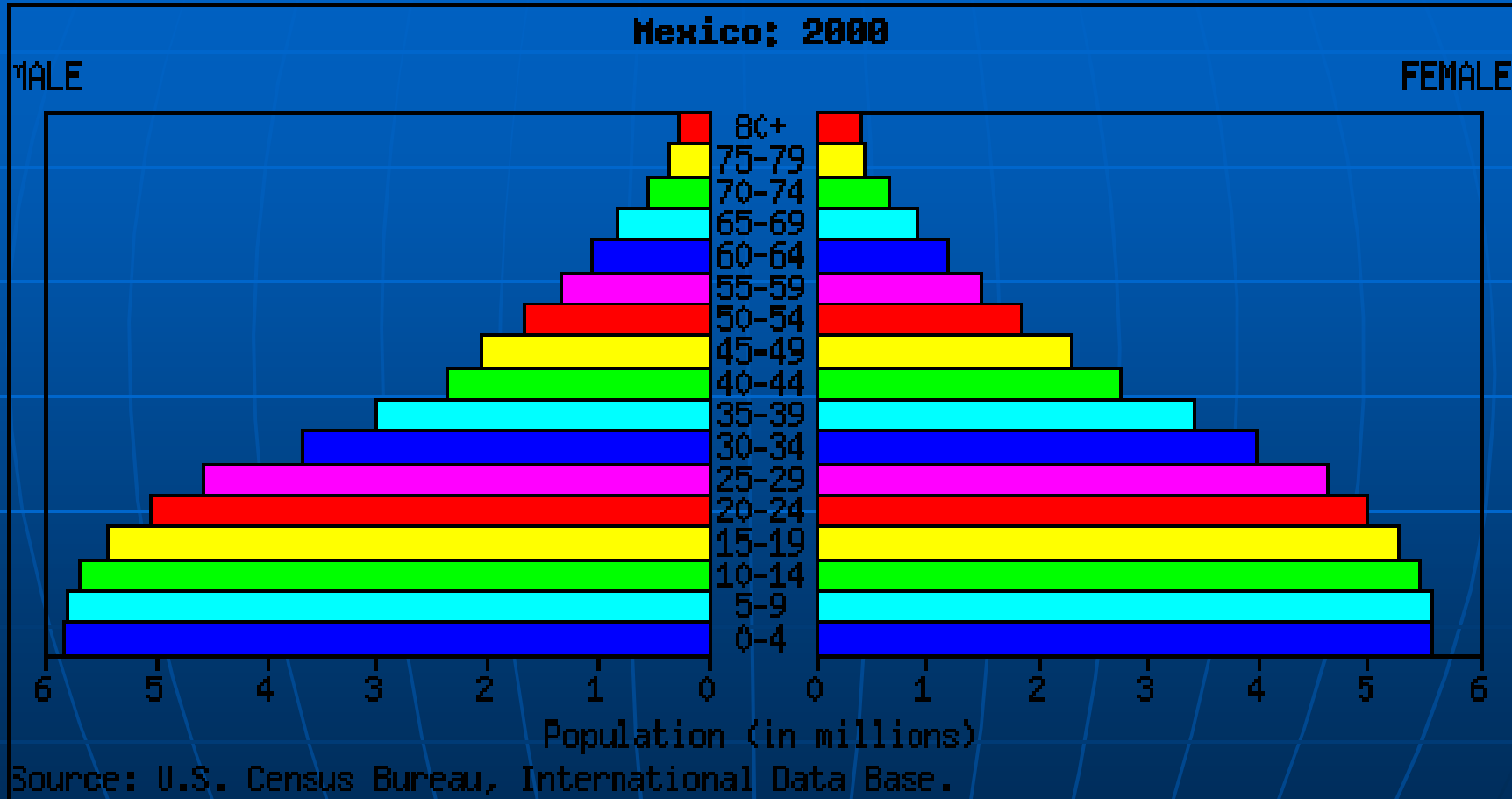
# What Affects Population Growth? (Continued)

- Education for Women: Birthrates are lower when women have access to education and have jobs outside of home. Options other than childbirth
- Cities: People in cities have better access to family-planning services and tend to have fewer children than in farm areas, where children are needed for work

# Age Structure Diagrams

- These diagrams are separated into three different age groups: young (ages 0-14), middle (ages 15-44), and old (ages 45 and up)
- Four stages of countries:
  - Expanding Rapidly (preindustrial, early transitional)
  - Expanding Slowly (late transitional)
  - Stable (industrial)
  - Declining (postindustrial)

# Expanding Rapidly



# Undeveloped, PreIndustrial Countries

- Majority of population consists of children
- The economy usually relies on farming
  - Lots of children needed for work
- Low education level
- Higher mortality rates
  - More children, less old people
  - Not as advanced as developed countries, lack effective medicine to fight disease

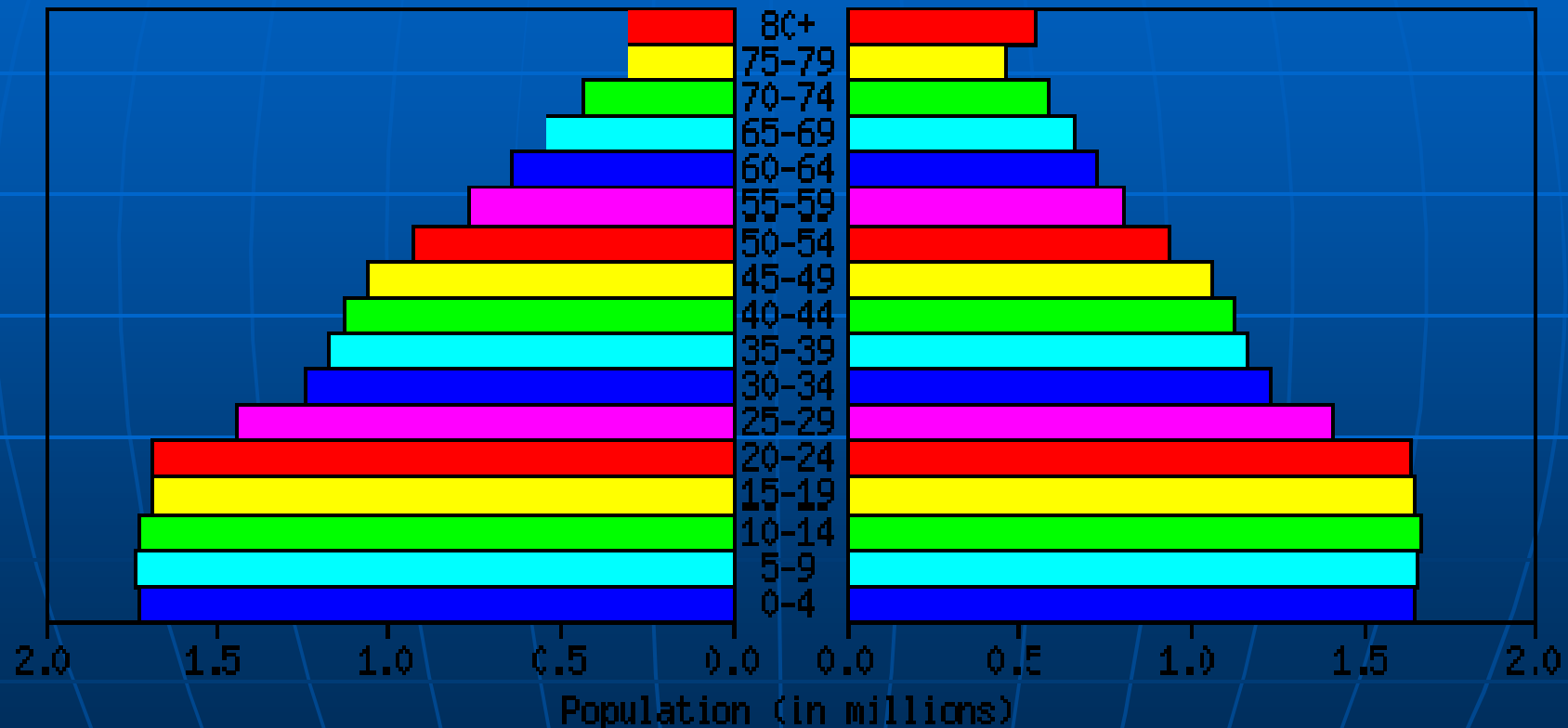


# Expanding Slowly, Late Transitional

Argentina; 2000

MALE

FEMALE

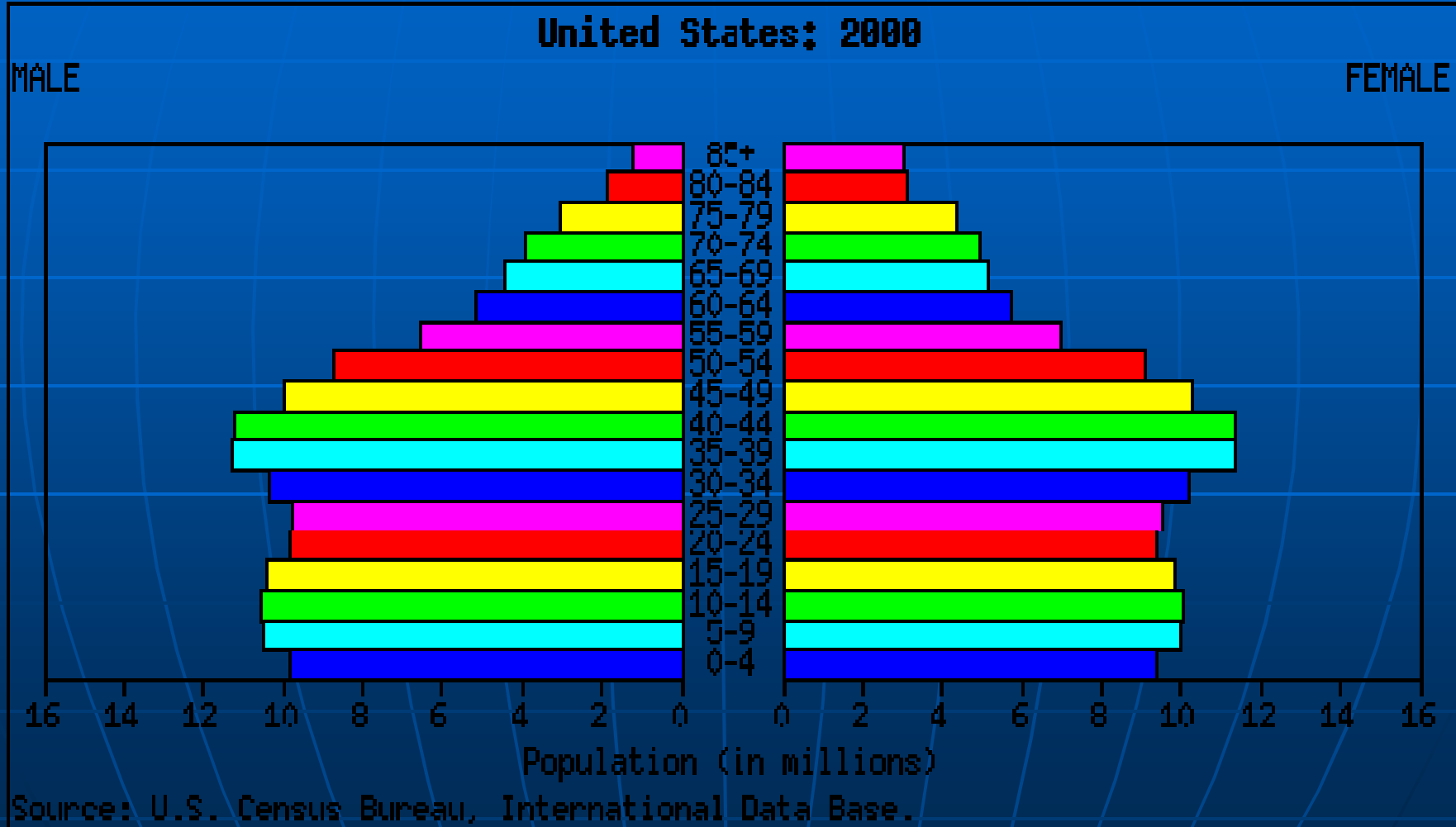


Source: U.S. Census Bureau, International Data Base.

# Transitional Countries

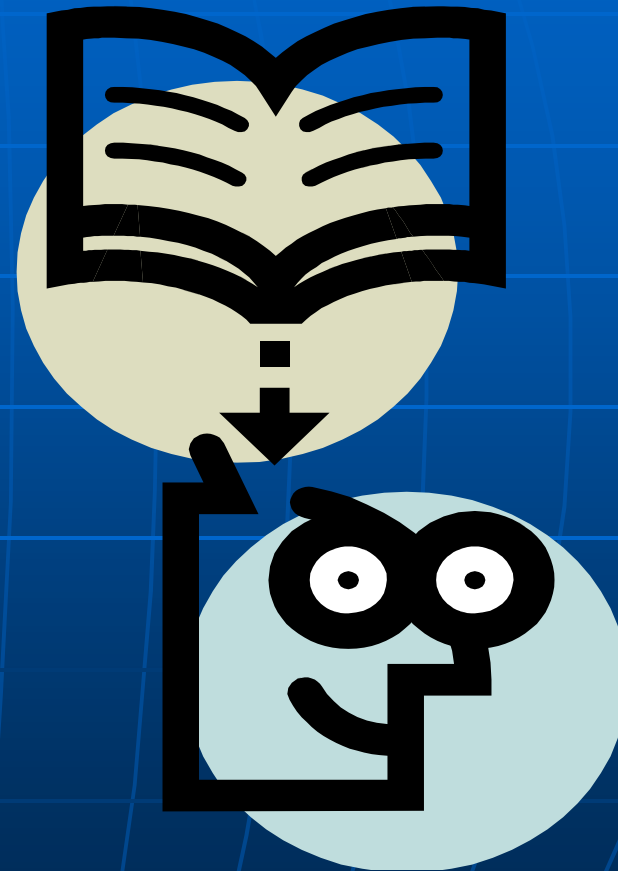
- Farming is becoming less important and industry more important
  - Industrialization is beginning
- Healthcare is becoming better
- Survival rate is higher
  - Birthrates stay the same as developing so population still grows

# Developed, Industrial



# Developed Country

- Higher education level
  - More office jobs and less farm work
- More advanced technology and medicine
  - Survival rate is higher
- Industry and business based economy
  - No need for lots of children to work on farms

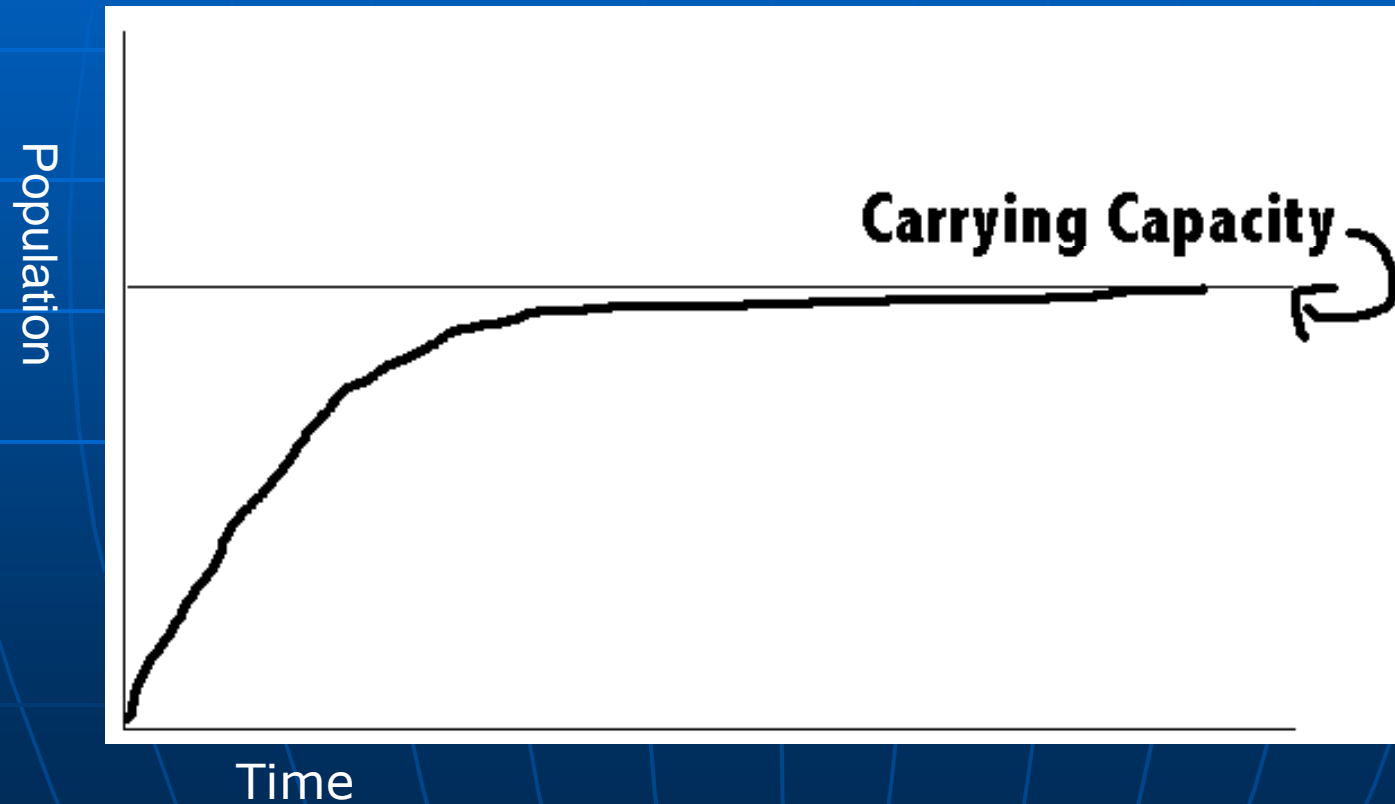


# Solutions to Controlling Population

- Increased Education
- Industrialization
- Minimizing immigration
- Allowing things that decrease population such as hunger, war, and disease.
- Legal mandates. I.e. China where offspring limit and extra taxes for additional children exist

# Types of Growth

## Logistic Curve

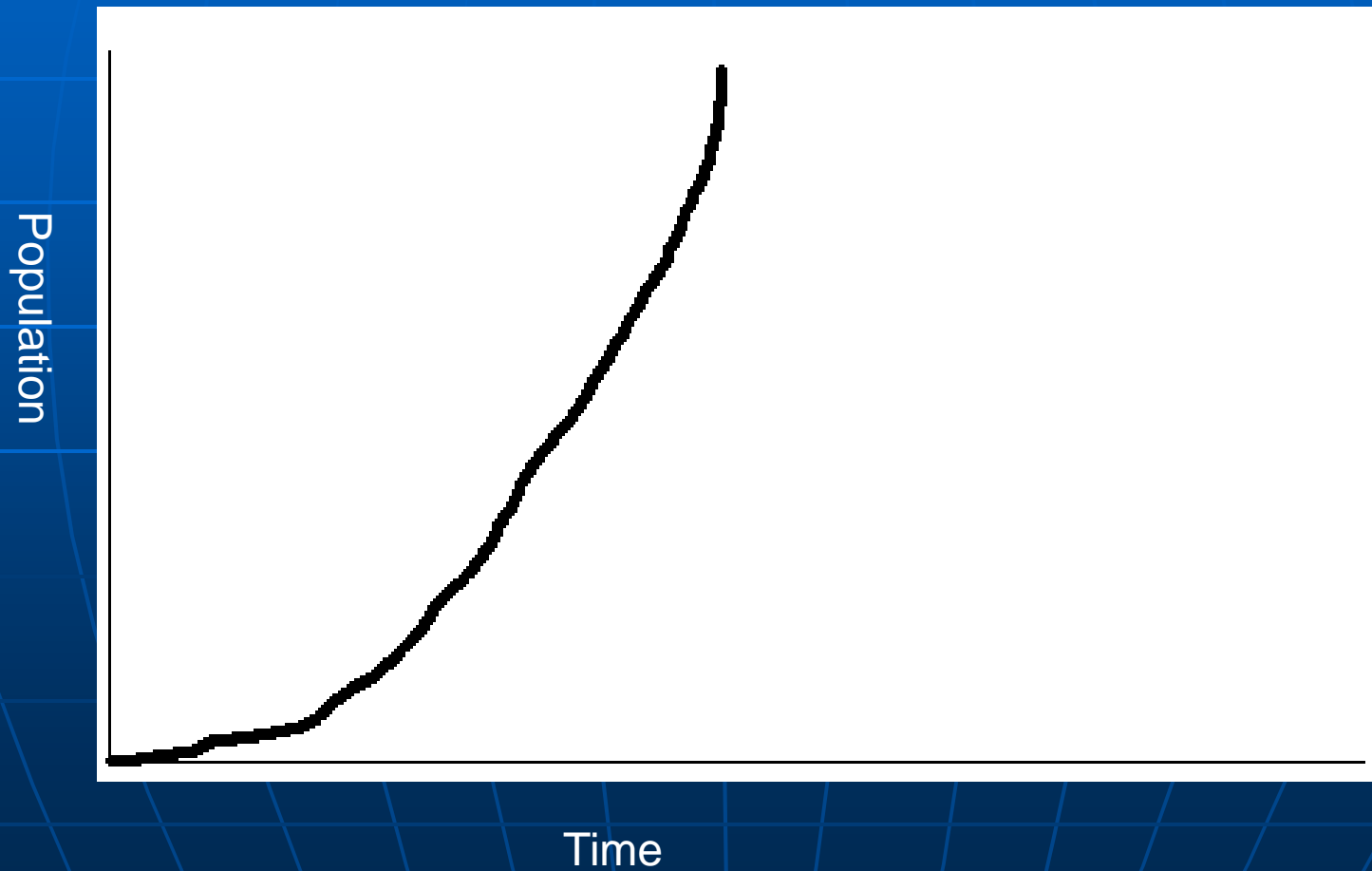


# Carrying Capacity

- Definition: The maximum number of individuals of a species that an environment can hold
- Limits the population size
- Things that affect the Carrying Capacity:
  - Availability of resources: food, living space, prey, energy, etc
  - Number of Predators
  - Natural disasters



# Exponential Curve

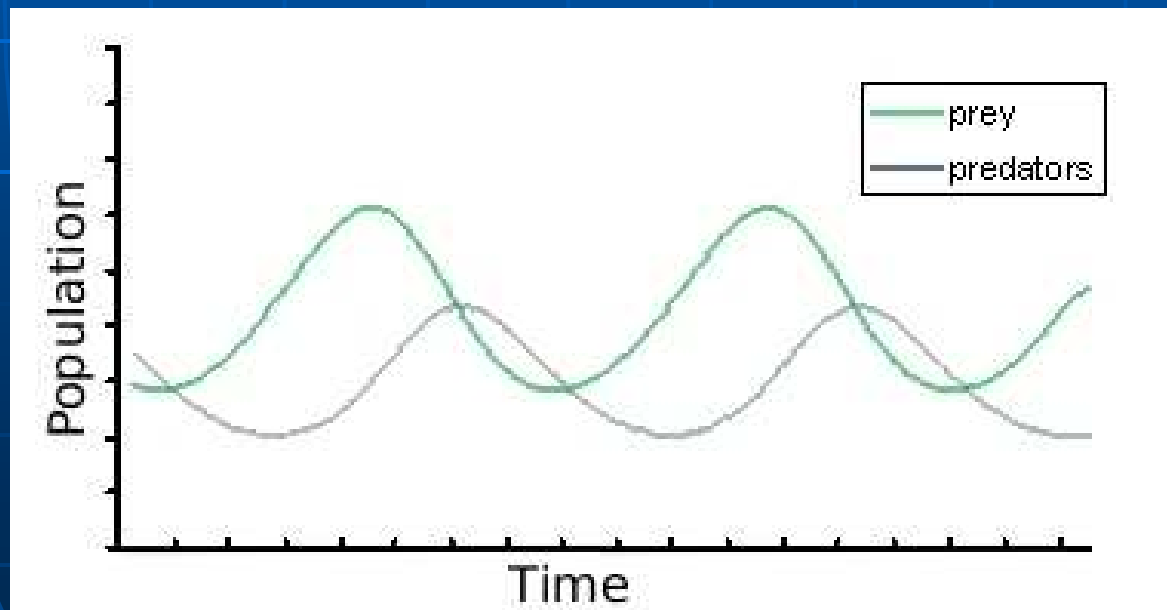


# Exponential Curve

- Not limited by resources
- Grows forever
  - The more there are, the faster they grow

# Predator/Prey Graph

- Notice the carrying capacity of the predator vs. the prey is lower...10% rule
- Notice the pattern between the predator's troughs and valleys vs. the prey's.



# Doubling Time

- Rule of 70:

Time to double =  $70/\text{growth rate } \%$

Example: If a country has a growth rate of 2%, then the time for that population to double would be

$70/2 = 35$  years.