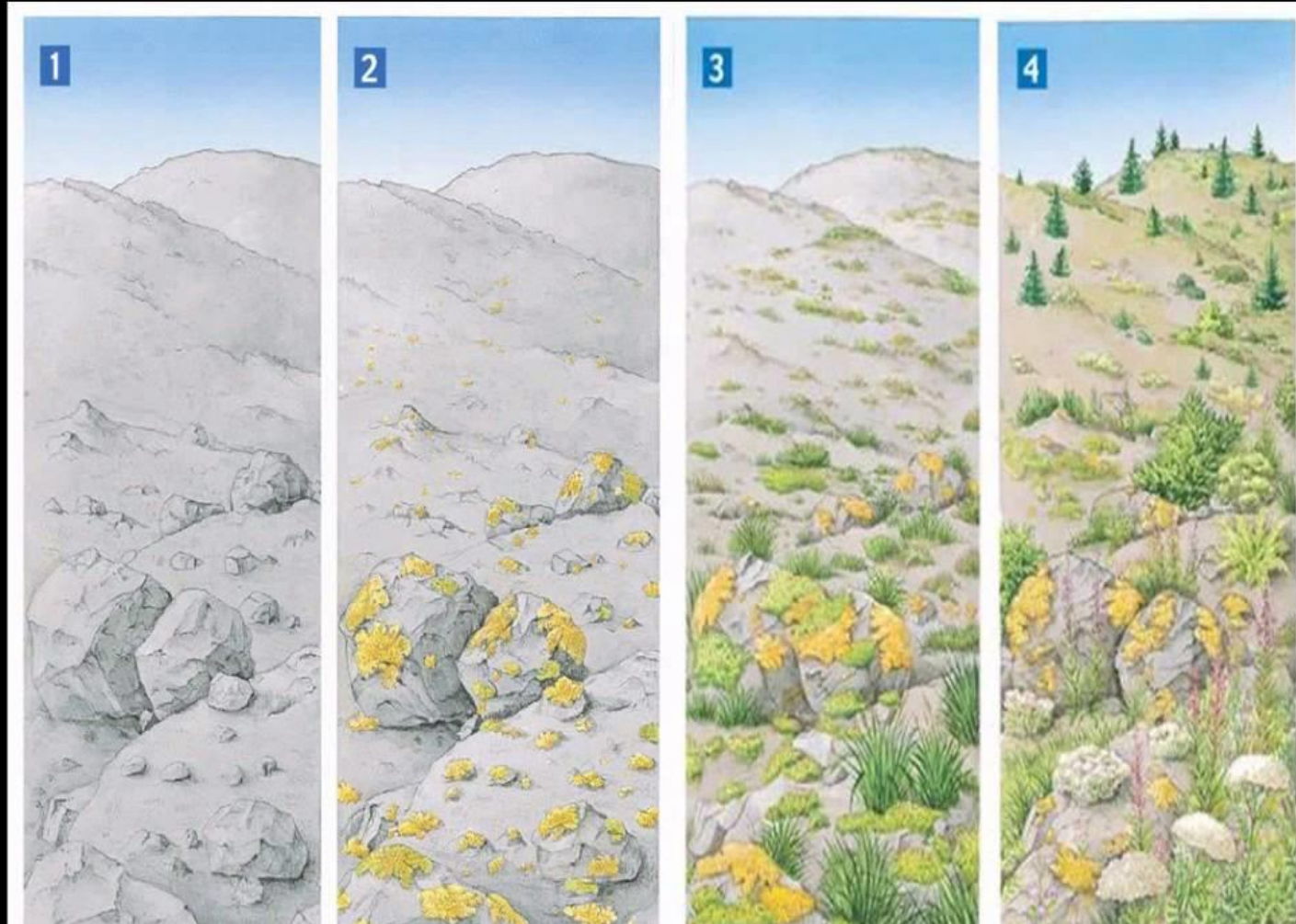


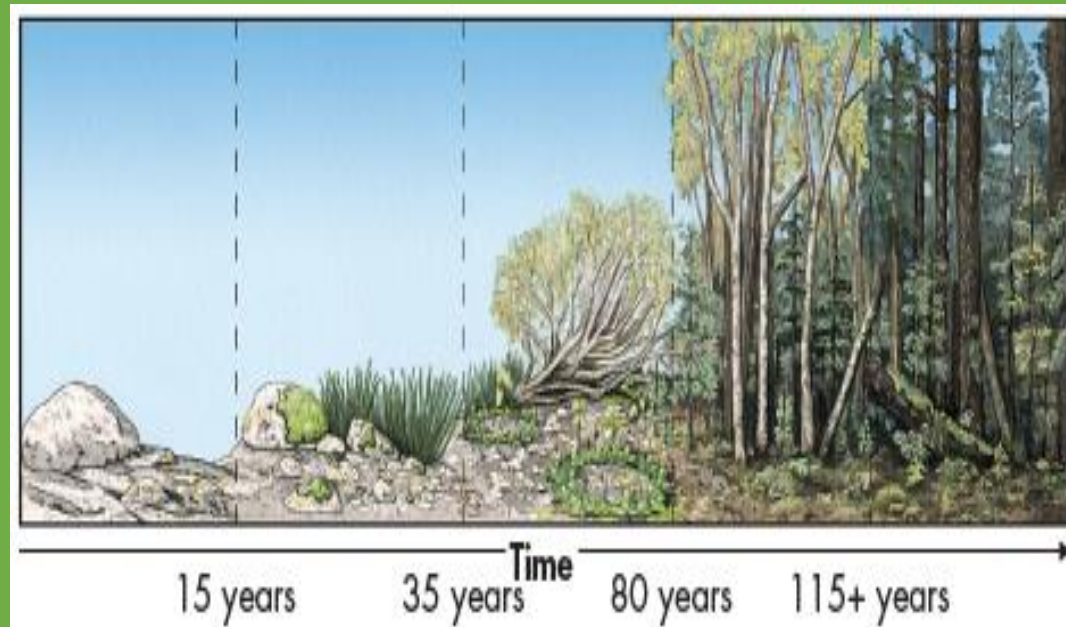
Ecological Succession



Ecological Succession

Succession

- **Ecological succession**- series of predictable changes that occurs in a community over time
 1. **Primary Succession**- begins in areas with **no** soil or life (ex- volcanic explosion)
 - **pioneer species**- 1st to colonize barren areas
 - Usually simple photosynthetic plants (moss/lichens)

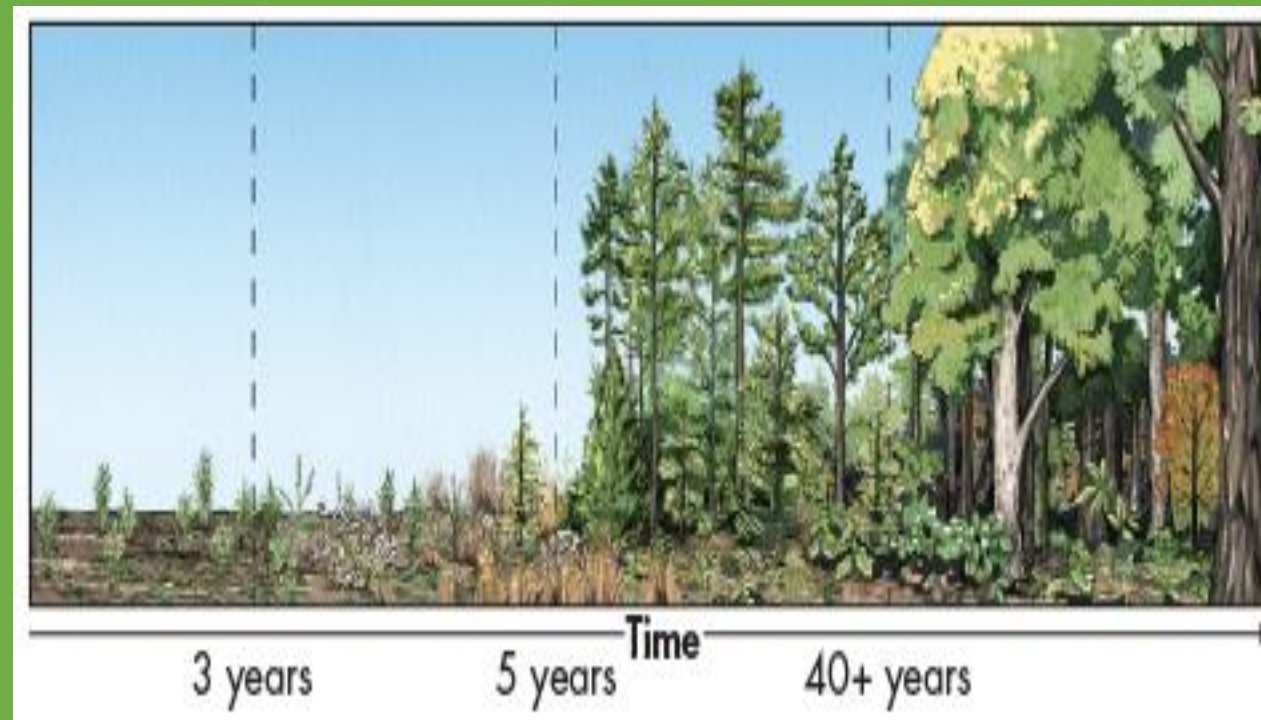


Succession

2. secondary succession- begins where soil remains after destructive event

- rebuilds faster than primary

Ex: wildfire, hurricane, natural disturbance, or human activities (logging & farming)



Populations



Studying Growth Rate

What factors affect population growth?

Birth rate and death rate

Immigration

Emigration



Dens

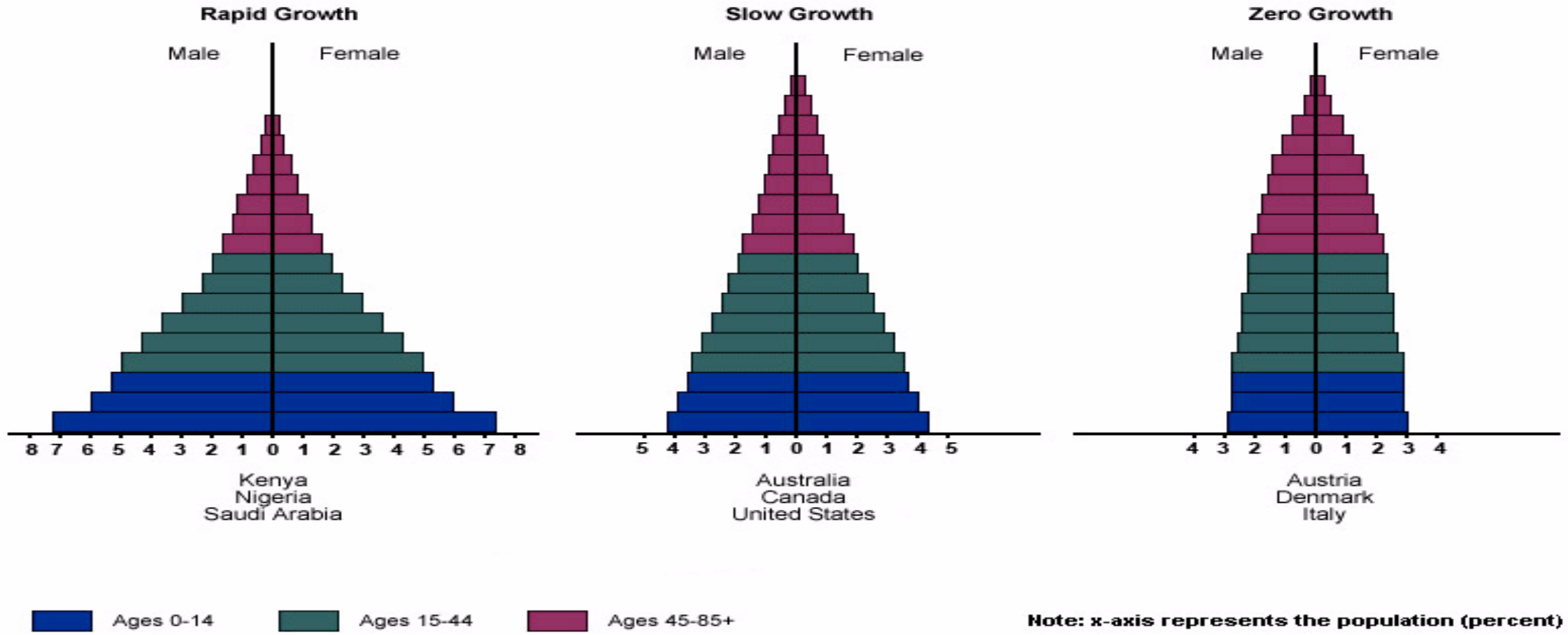
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Birth Rate & Death Rate

- Increase population:
 - birth rate is higher than the death rate.
- Decrease population:
 - death rate is higher than the birth rate

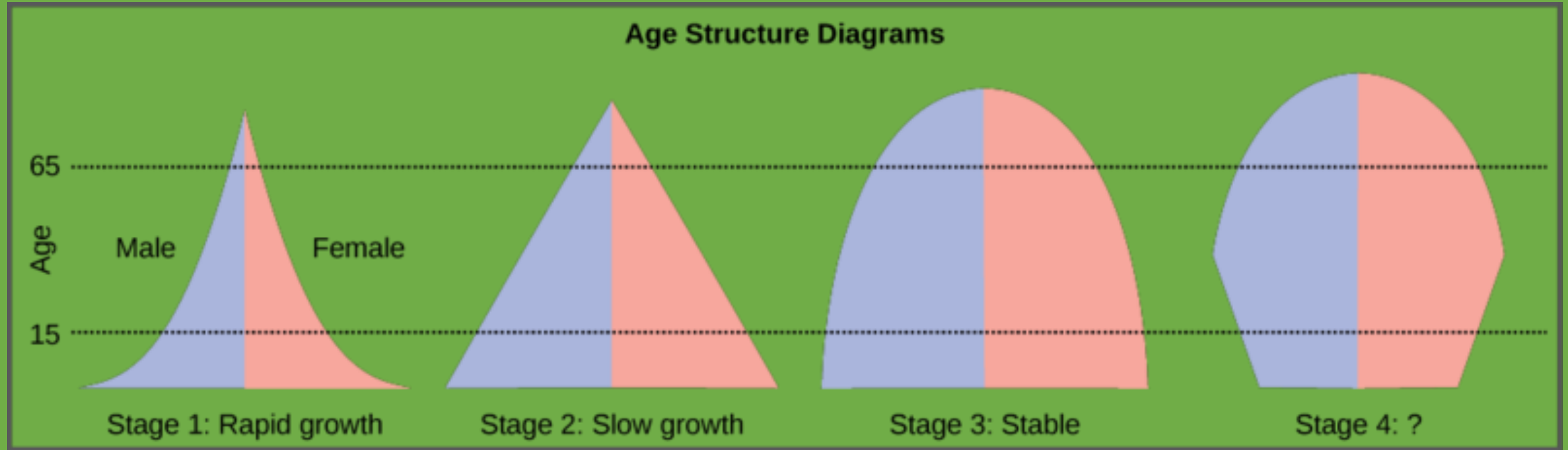


Population Age Diagrams



The higher the percentage of your population that is in reproductive years, the faster your population will grow.

Population Age Diagrams



What do you think will happen to the population in stage 4?

Why?

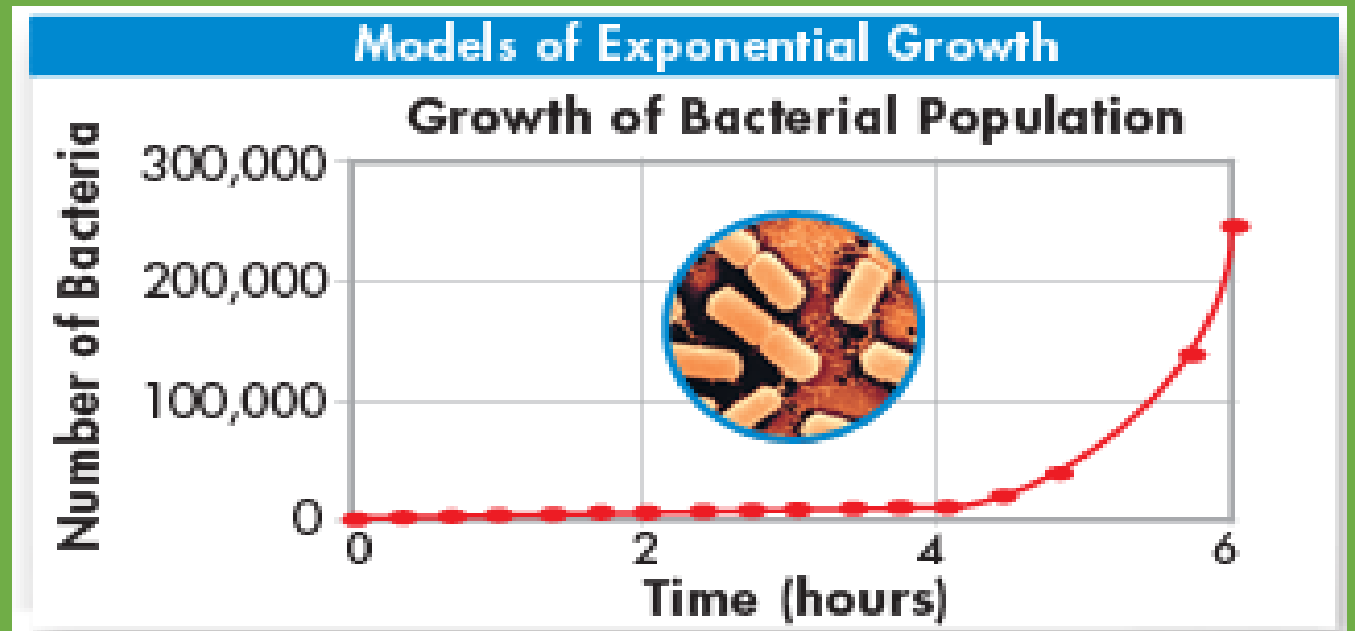
Immigration & Emigration

- Increase population:
 - individuals move in from elsewhere, a process called immigration.
- Decrease population:
 - individuals move out of the population, a process called emigration.



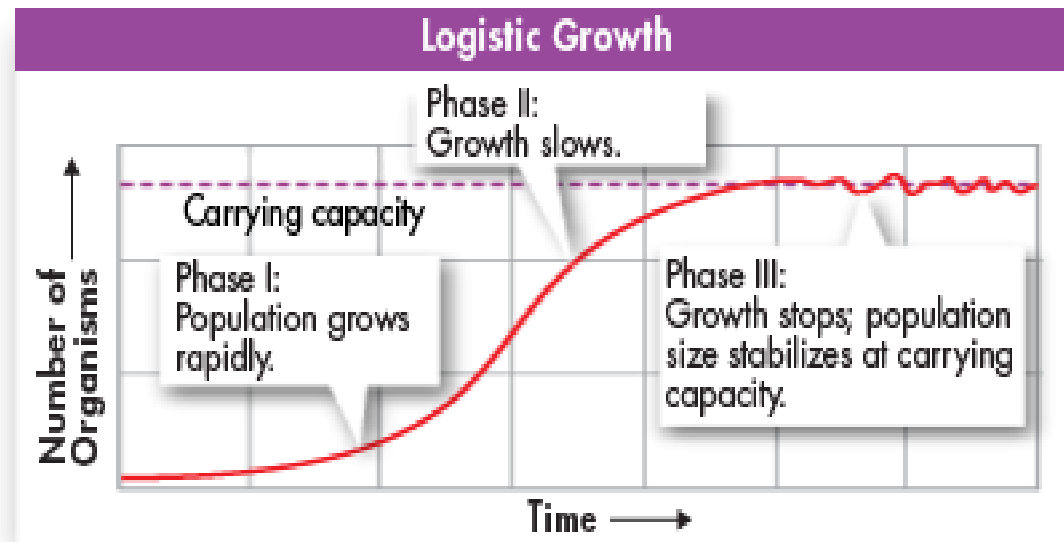
Exponential Growth:

- Ideal conditions & *unlimited* resources, population grows exponentially
- the larger a population, faster it grows
- on a graph over time, a **J-shaped curve**
- **Human Population**



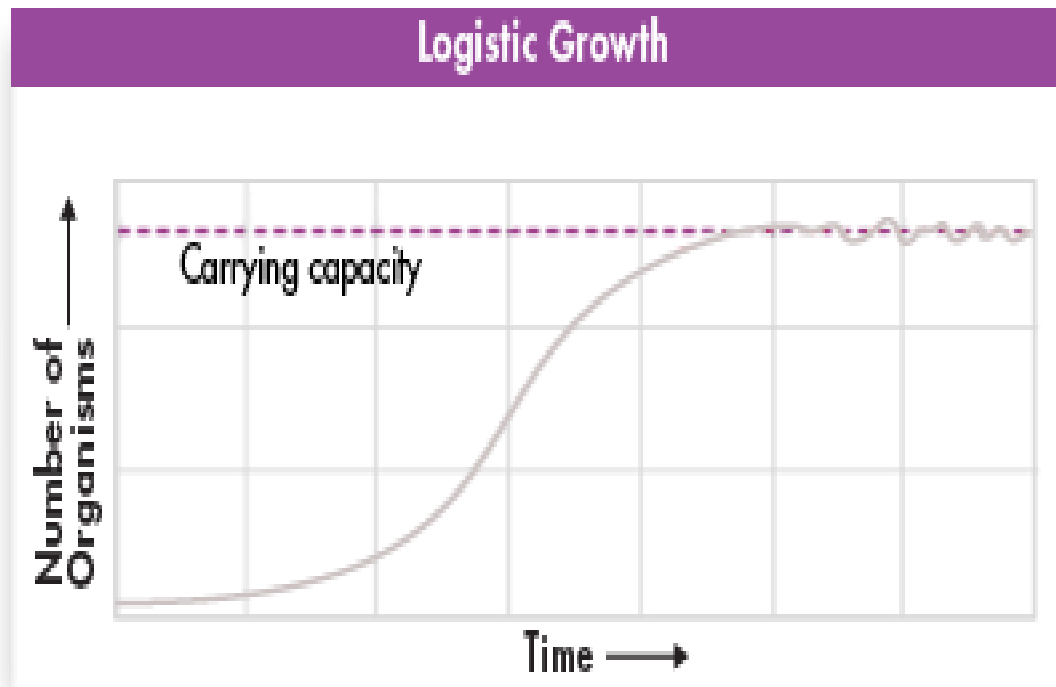
Logistic Growth:

- Population's growth slows & then stops, following exponential growth.
- Natural populations do not grow exponentially forever; something stops growth
- On a graph, curve has an **S-shape**



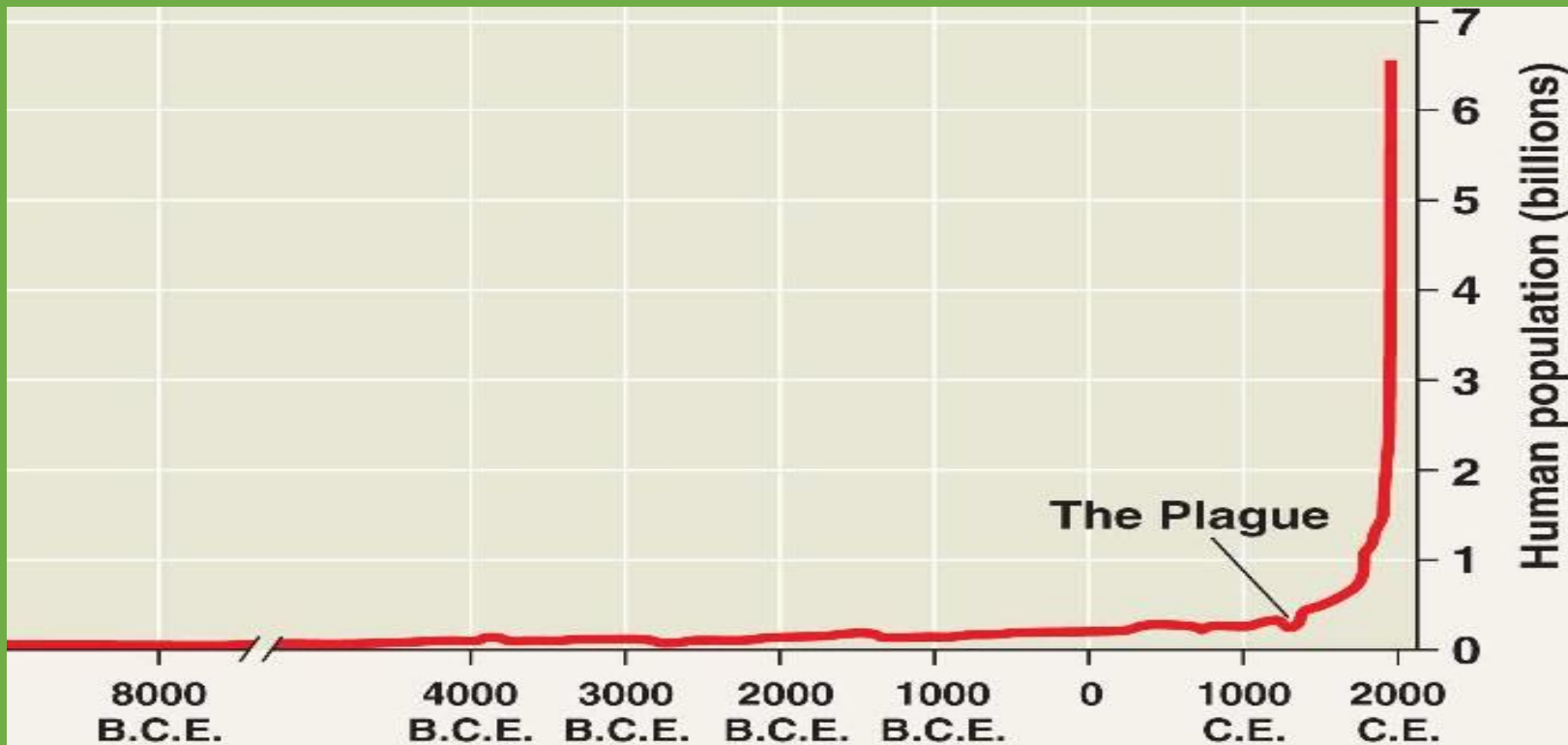
Carrying Capacity

- **Carrying capacity**- maximum # of individuals that a particular environment can support.
- Where dotted line intersects the y-axis = carrying capacity.

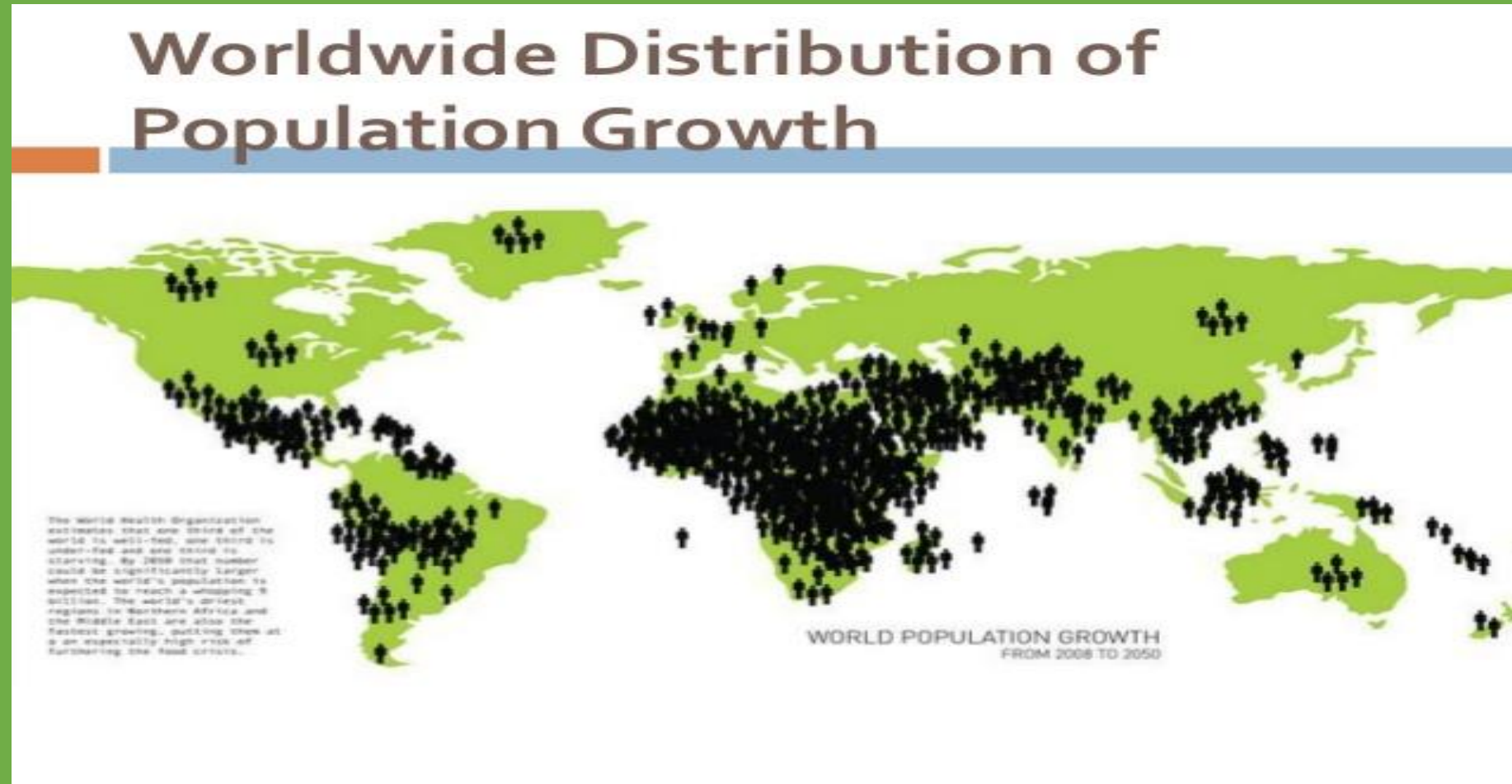


Human Population Growth: *Think About It!*

- Based on the graph, when did human population start to become exponential?
- Why did human population growth become exponential?



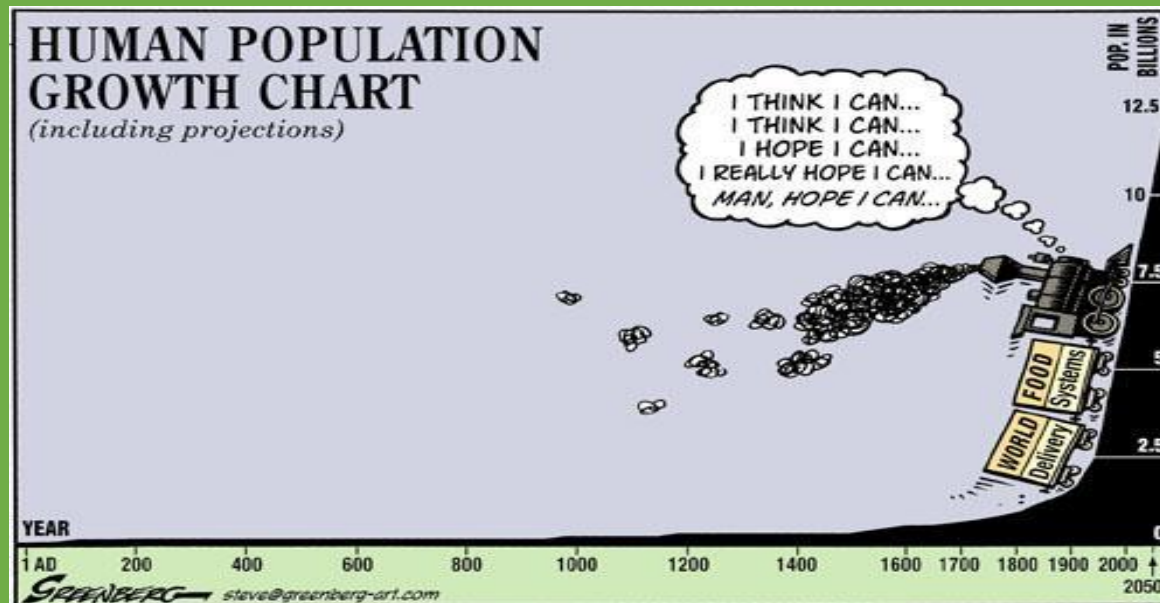
Human Population Growth Centers



- Based on this chart, where is most of the population growth occurring?

Human Population Growth: *Think About It!*

- What could cause human population growth to become logistic?
- Do you think we can maintain this type of growth forever?



Limits to Growth: Density Dependent

limiting factor- factor that controls the growth of a population

Density-dependent limiting factors -operate strongly when population density is large.

- competition, predation, herbivory, parasitism, disease, stress from overcrowding

1. Competition:

- Populations become crowded, individuals compete- food, water, space, sunlight,

2. Predation:

- Predator population affects prey population

Limits to Growth: Density Dependent

3. Parasitism and Disease:

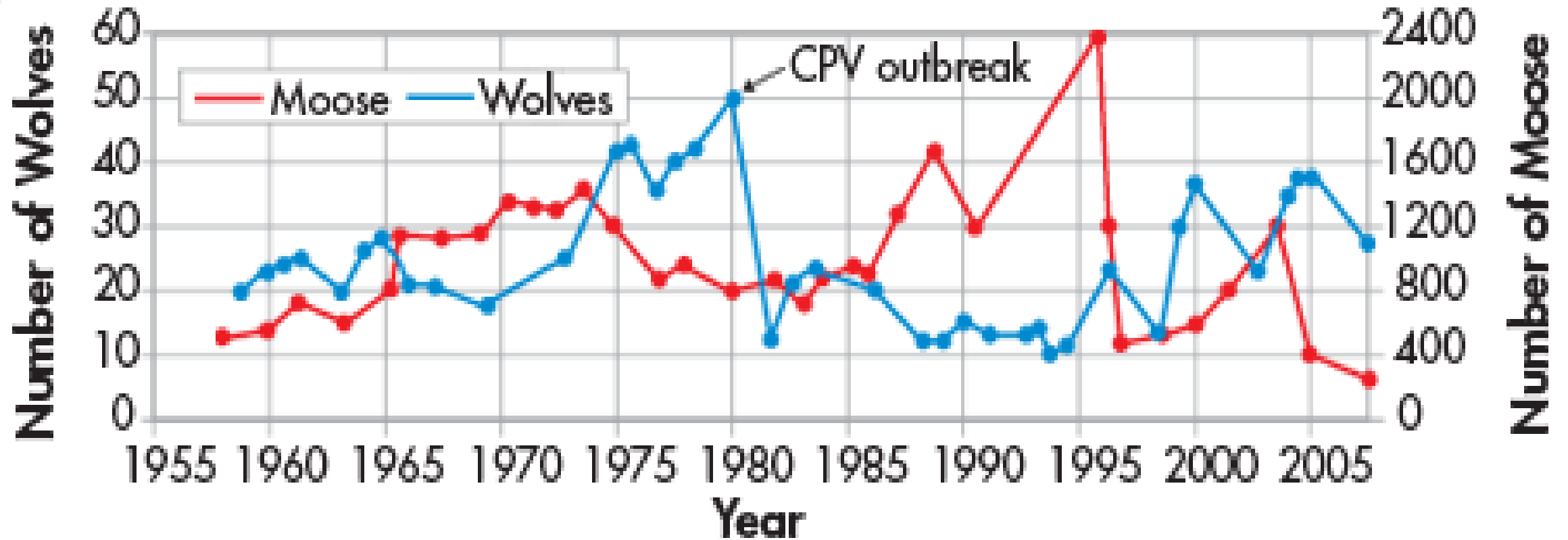
- Parasites & Disease-causing Organisms:
- more dense population = easier to spread

4. Stress From Overcrowding:

- species fight if overcrowded; increase stress & weaken body's ability to resist disease
- Females neglect, kill, or eat own offspring
- decrease births, increase deaths, & increase emigration

Case Study

Wolf and Moose Populations on Isle Royale



- How does the wolf population affect the moose population?
- Why did the moose population crash around 1995?
- What density dependent factors are being illustrated? (*Hint: It is more than one*)

Limits to Growth: Density Independent

Density-Independent limiting factors- affect all populations regardless of size & density

- Unusual weather- hurricanes, droughts, floods, & natural disasters- wildfires



Population Review

What is this graph showing?

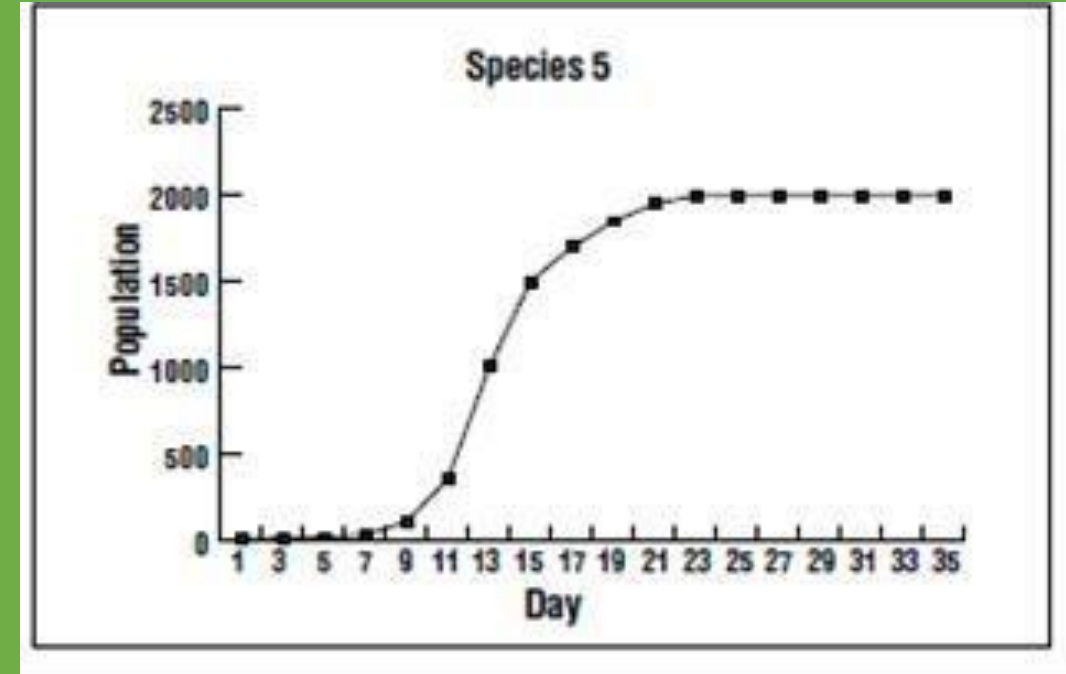
Which of the following situations MOST likely resulted in the growth pattern of the moose population shown?

The moose had no natural predators

The moose overgrazed the grasses

After a period of time, the moose adjusted to the available food on the island.

The moose contracted a new disease



Population Review

What is this graph showing?

At which point(s) did the population hit carrying capacity?

Which explanation below is the best reason why the carrying capacity dropped as shown in the graph?

The animals began to migrate

The animals began to have fewer offspring

Competitors moved into the area

The area began to experience drought conditions

