CONCEPT: MICROBIAL GROWTH CURVES IN A CLOSED SYSTEM

●Cells grown in a lab with a *fixed* volume of liquid enclosed in a container or flask is called a _____ ***system***.

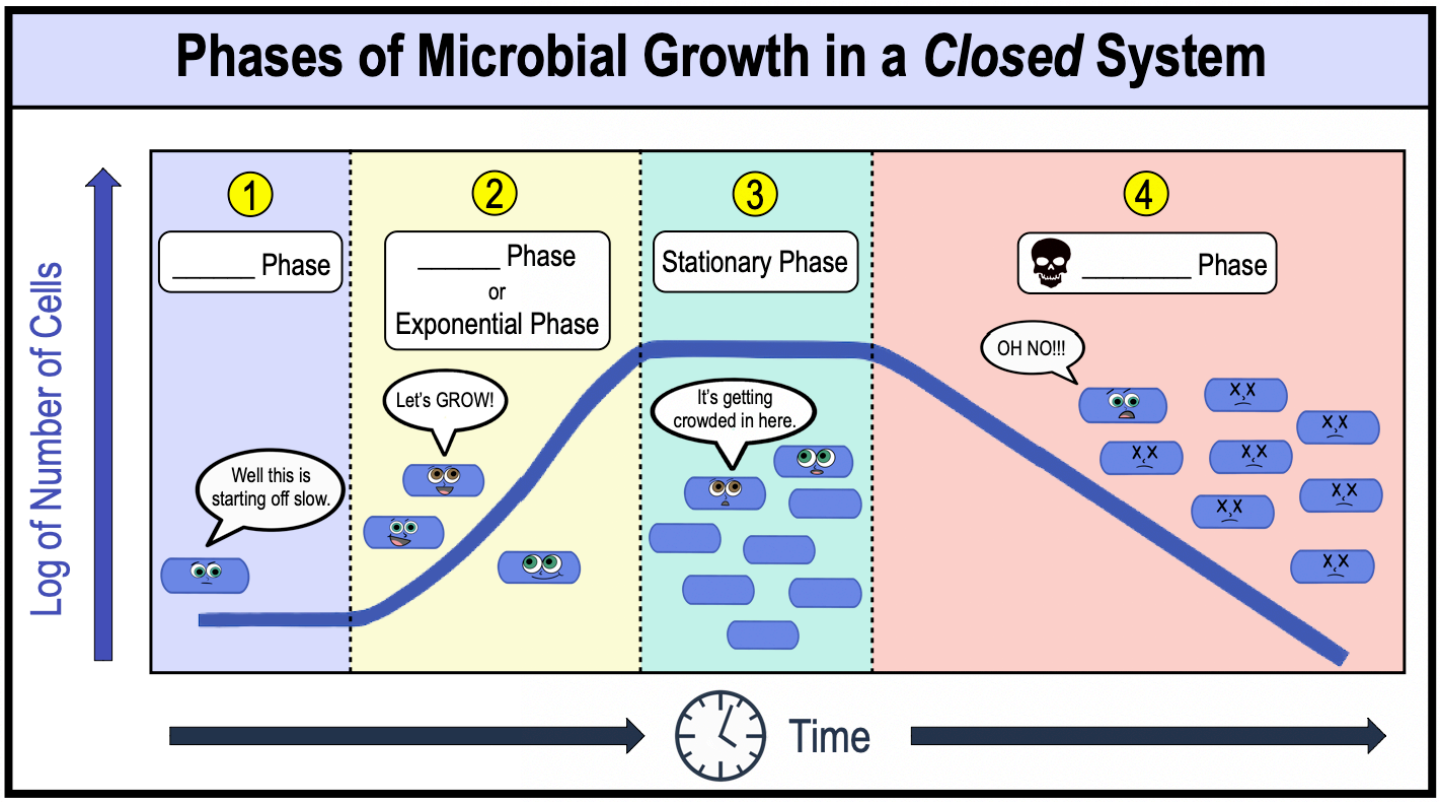
□ Nutrients in the system are *limited* & can _____ support infinite growth.

●Bacterial growth in a closed system occurs in _____ distinct phases:

1. **Lag phase:** cells from a _____ colony synthesize enzymes required for cell *growth*.
2. **Log (_____) phase:** cells division occurs at a *continuous* rate during active growth phase.
3. **Stationary phase:** nutrient levels are _____; cells stop growing & slowly start to die.
4. _____ **(Death) phase:** number of viable cells die off.

●Growth rate is plotted using a *logarithmic* (_____) scale for number of cells.

EXAMPLE: Plotting microbial growth curves.



PRACTICE: The time between inoculation and the beginning of growth in a microbial culture is referred to as:

a) Lag phase.
b) Log phase.
c) Dormant phase.
d) Exponential growth phase.

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PRACTICE: The log phase of the bacterial growth curve is marked by

a) A decrease in cell mass.
b) Dormant, metabolically inactive cells.
c) Viable cells dying.
d) Vigorously dividing cells.

PRACTICE: In the growth curve of a bacterial population, the bacteria are rapidly increasing in number during the:

a) Lag phase.
b) Exponential (log) phase.
c) Stationary phase.
d) Decline phase.
e) Boomer phase.

PRACTICE: Rates of cell production and cell death are approximately equal during the _____ phase of microbial growth.

a) Stationary.
b) Death.
c) Intermediate.
d) Lag.
e) Log.

PRACTICE: In a rapidly multiplying bacterial population, cell numbers increase

a) Arithmetically.
b) Logarithmically.
c) Linearly.
d) Randomly.

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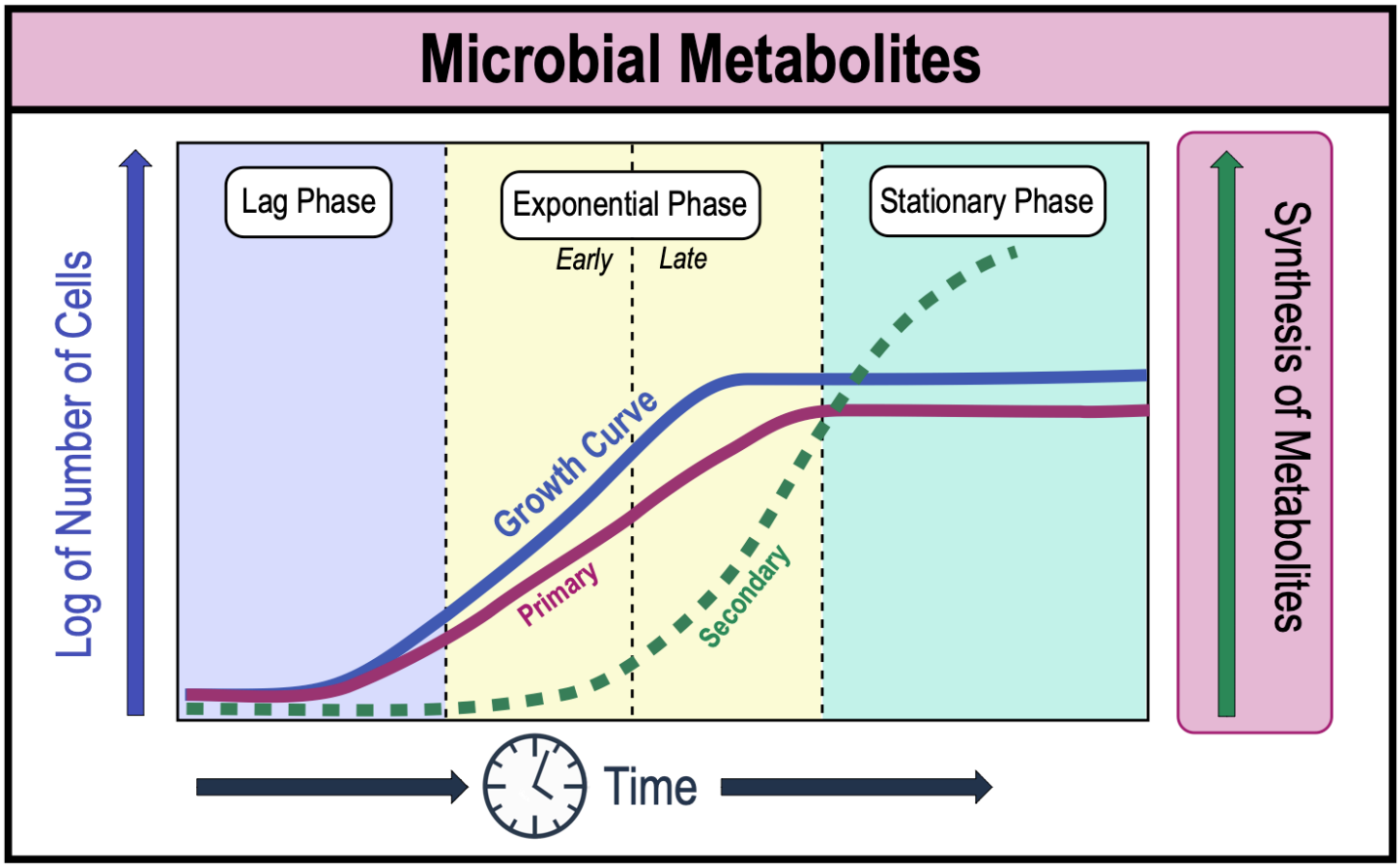
Primary & Secondary Metabolites

●The *early* & *late* stages of the log growth phase can be monitored by the production of certain _____.

1. _____ **Metabolites:** produced during _____ log & are used by the cell during *normal growth*.
2. _____ **Metabolites:** produced during _____ log & are required for cell *survival*.



PRACTICE: Late log phase of the bacterial growth curve:

a) Is marked by the production of primary metabolites.

b) Is marked by the production of secondary metabolites.

c) Is a transition into the death phase.

d) Shows a decline in cell numbers.