

# BACTERIAL GROWTH

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## GENERAL CONCEPTS – BINARY FISSION

BINARY FISSION & GENERATION TIME

THE ABILITY OF BACTERIA TO INCREASE IN NUMBERS

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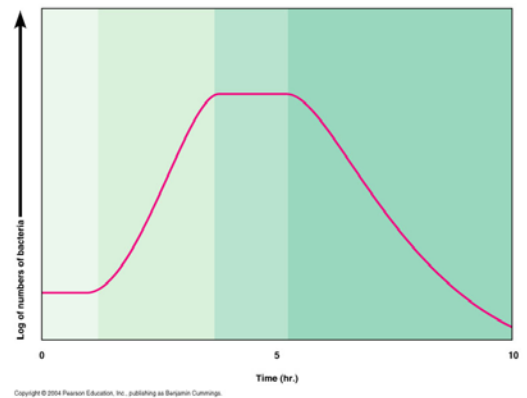
## THE BACTERIAL GROWTH CURVE

LAG

LOG

STATIONARY OR PLATEAU

DEATH OR DECLINE



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## GROWTH REQUIREMENTS

CARBON & ENERGY  
AUTOTROPHS

HETEROTROPHS

TEMPERATURE

THERMOPHILES

MESOPHILES

PSYCHROPHILES

OXYGEN

AEROBES

OBLIGATE ANAEROBES

FACULTATIVE

MICROAEROPHILES

SALT

HALOPHILES

TAKE A LOOK AT THERMOPHILES IN THE VIDEO PODCAST ("HOT WATER ECOSYSTEMS") ON MY WEB SITE AT <http://podcast.broward.edu/~sobenauf/0014a%20Hot%20Water%20Ecosystem.m4v>

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## MEASURING GROWTH

PLATE COUNTS

FILTRATION

DIRECT COUNTS

ABSORBANCE / TURBIDITY

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	a. Obligate Aerobes	b. Facultative Anaerobes	c. Obligate Anaerobes	d. Aerotolerant Anaerobes	e. Microaerophiles
<b>Effect of Oxygen on Growth</b>	Only aerobic growth; oxygen required.	Both aerobic and anaerobic growth; greater growth in presence of oxygen.	Only anaerobic growth; ceases in presence of oxygen.	Only anaerobic growth; but continues in presence of oxygen.	Only aerobic growth; oxygen required in low concentration.
<b>Bacterial Growth in Tube of Solid Growth Medium</b>					
<b>Explanation of Growth Patterns</b>	Growth occurs only where high concentrations of oxygen have diffused into the medium.	Growth is best where most oxygen is present, but occurs throughout tube.	Growth occurs only where there is no oxygen.	Growth occurs evenly; oxygen has no effect.	Growth occurs only where a low concentration of oxygen has diffused into medium.
<b>Explanation of Oxygen's Effects</b>	Presence of enzymes catalase and superoxide dismutase (SOD) allows toxic forms of oxygen to be neutralized; can use oxygen.	Presence of enzymes catalase and SOD allows toxic forms of oxygen to be neutralized; can use oxygen.	Lacks enzymes to neutralize harmful forms of oxygen; cannot tolerate oxygen.	Presence of one enzyme, SOD, allows harmful forms of oxygen to be partially neutralized; tolerates oxygen.	Produce lethal amounts of toxic forms of oxygen if exposed to normal atmospheric oxygen.

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