



KING ABDULAZIZ UNIVERSITY

## Lab # 6

# The Effects of Temperature on Growth

Physiology of microbiology  
Bio 336



# The Effects of Temperature on Growth



## Environmental Effects on Microbial Growth:

- 1-Physical factors
- 2- Chemical factors
- 3- Biological factors

# The Effects of Temperature on Growth




## The Physical factors :

- Temperature
- Radiation
- Oxygen classes
- pH
- Osmotic pressure

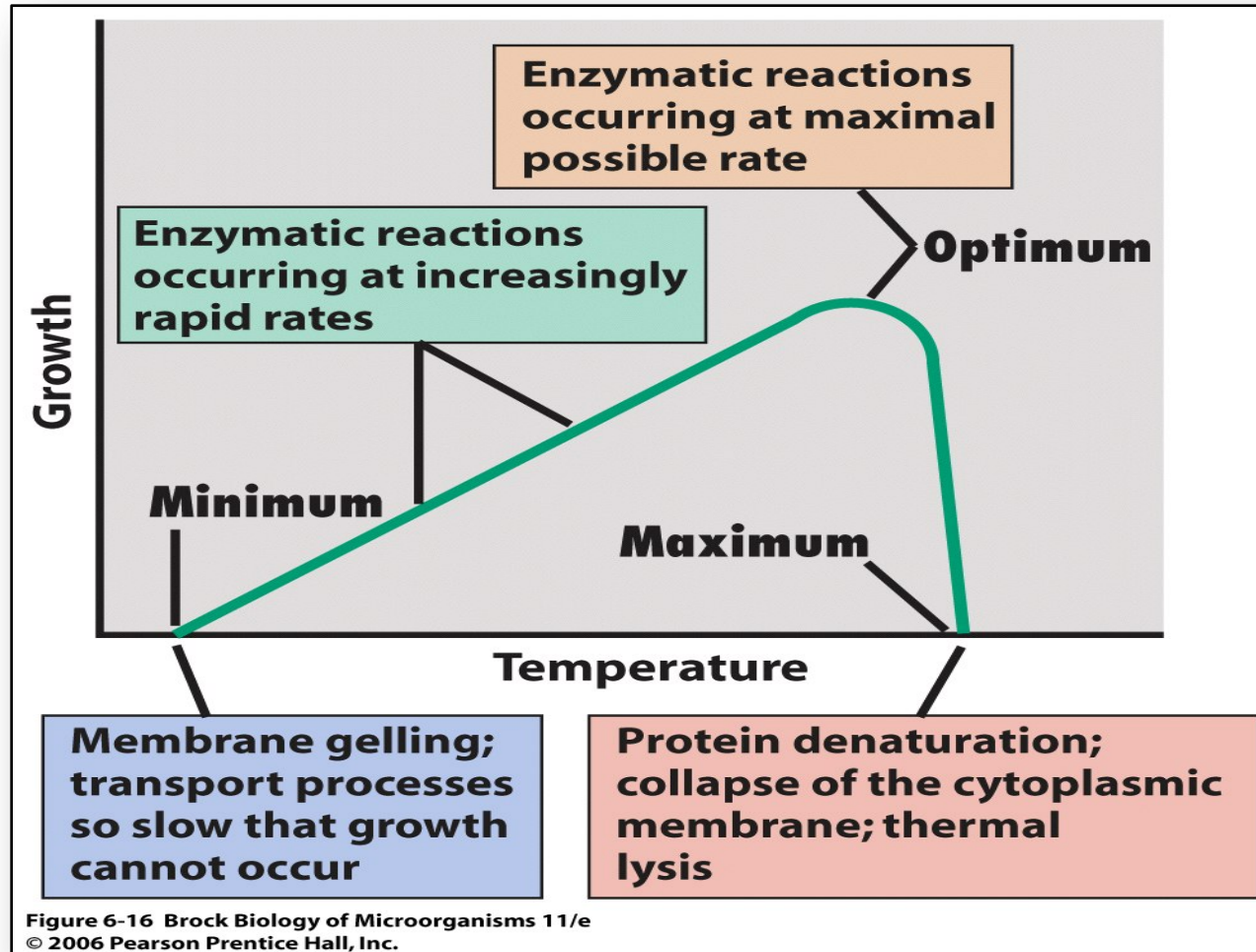
# The Effects of Temperature on Growth



## Temperature and Microbial Growth:

-  Dependence of growth of microorganisms on temperature is largely related to activation and inactivation of enzyme systems in microorganisms.

# The Effects of Temperature on Growth



The effects of temperature contribute to the death of microbial cells

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## Temperature Range:

The range of temperatures for the growth of a given microbial species can be expressed as three cardinal temperatures so Each microbes has 3 different temperature range:

- Ⓢ Minimum temperature: it's the lowest temperature the microbe can grow on
- Ⓢ Maximum temperature: the highest
- Ⓢ Optimum temperature: the best

Psychrophilic: low temperature  $< 10^{\circ}\text{C}$

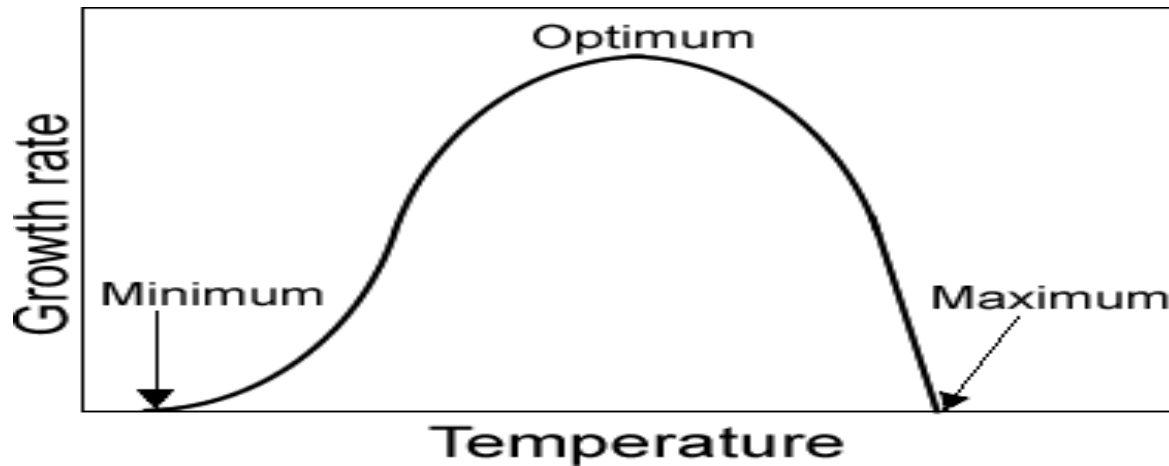
Mesophilic:  $20 - 40^{\circ}\text{C}$

Thermophilic: high temperature  $> 60^{\circ}\text{C}$

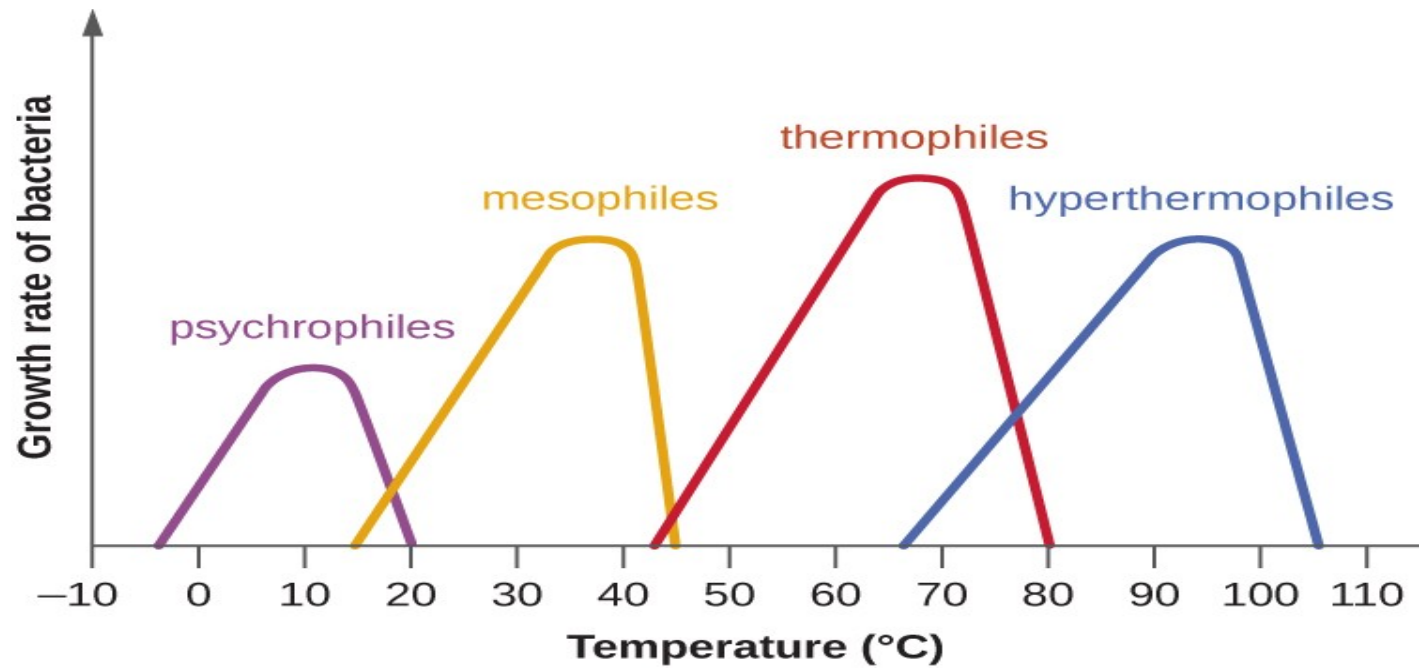
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Temperature is the major environmental factor controlling microbial growth



Classification of Microorganisms by Temperature Requirements



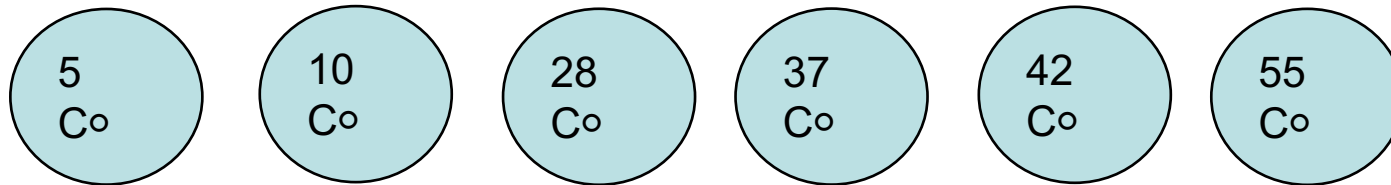
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## Experiment # 1

estimation of microbial growth optimal temperatures

### ❑ Material and Experimental Protocols:



### ❑ Observation and results:

### ❑ Conclusion:

# The Effects of Temperature on Growth



## Thermal Death Time TDT of microorganisms :

Microbes can be partially or completely eliminated by heat treatment. However, the time and temperature used are dependent on the type and number of microorganisms.

**Thermal death point:** it is the temperature at which the microbe dies due to the high temperature.

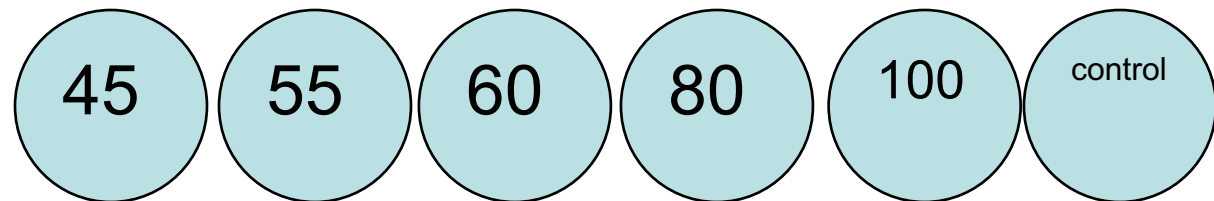
# The Effects of Temperature on Growth



## Experiment # 2

Thermal Death Point Measurement.

□ Material and Experimental Protocols:



10 minuets then put all tubes in ice bath.

