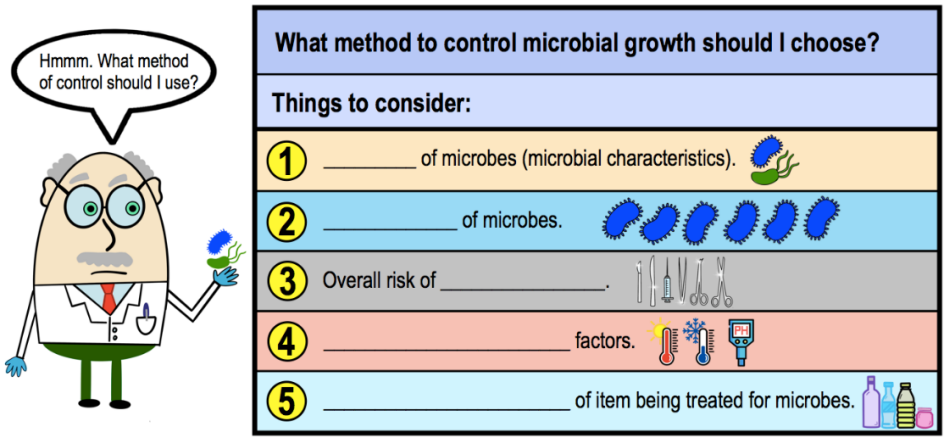
CONCEPT: SELECTING A METHOD TO CONTROL MICROBIAL GROWTH

●Selecting an effective method to control microbial growth is challenging; each method has advantages & disadvantages.



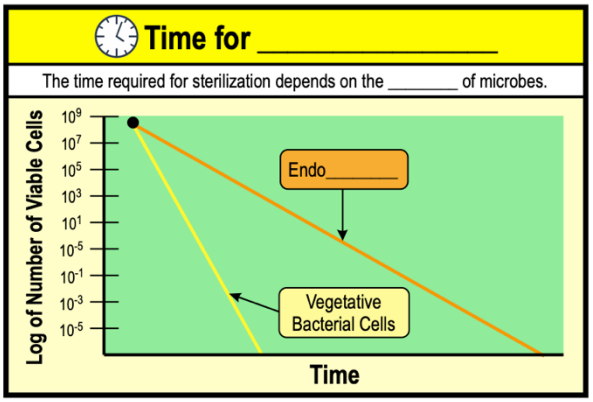
1) Types of Microbes (Microbial Characteristics)

●The _____ of microbe & its characteristics are important considerations in selecting a growth control method.

- □ Some microbes are highly _____ to a particular treatment whereas others are *sensitive*.
- □ The type of microbe can dictate whether a disinfection or sterilization procedure should be used.

EXAMPLE: Resistance Levels of Different Types of Microbes.

_____ of Microbe	Resistance to Microbial Control Methods	Microbial Control Method
Enveloped Viruses SARS-CoV-2 (Covid-19), HIV, Hepatitis B	_____ Resistant (Susceptible)	Low Level Disinfection
Vegetative _____ *S. aureus, N. gonorrhoeae*		
Fungi Ringworm, Athlete's Foot		High Level Disinfection
Non-Enveloped _____ Poliovirus (Polio), Rhinovirus (Common Cold)		
Mycobacteria *M. tuberculosis, M. terrae*		Sterilization
Bacterial Endospores *B. cereus, C. perfringens*		
_____ Creutzfeldt-Jakob disease (CJD)	_____ Resistant	Prion Elimination



PRACTICE: Which of the following questions are important to answer *before* attempting to control a microbial population?

a) What type of microbe am I trying to control?
b) What kind of environment is the microbe in?
c) What is the size of the microbial population?
d) All are important questions to answer.

PRACTICE: Which microbe has the highest level of resistance to control methods that humans currently possess?

a) Mycobacteria (bacteria that cause tuberculosis).
b) Enveloped viruses (Covid-19 virus, HIV, etc.).
c) Prions.
d) Bacterial endospores.

CONCEPT: SELECTING A METHOD TO CONTROL MICROBIAL GROWTH

2) Number of Microbes

●When a microbial population is treated with physical or chemical processes, they usually die at a _____ rate.

□ The *LARGER* the population of microbes, the _____ it takes to destroy the entire population.

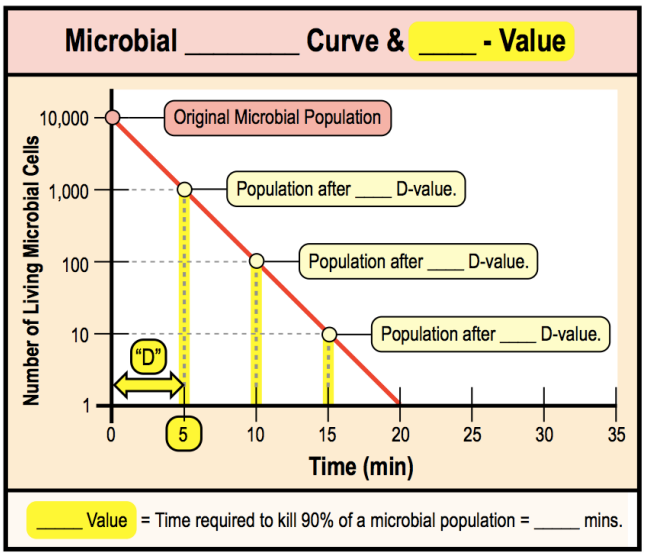
□ *Washing* & *scrubbing* removes microbes/*biofilms* & _____ time to sterilize/disinfect an item.

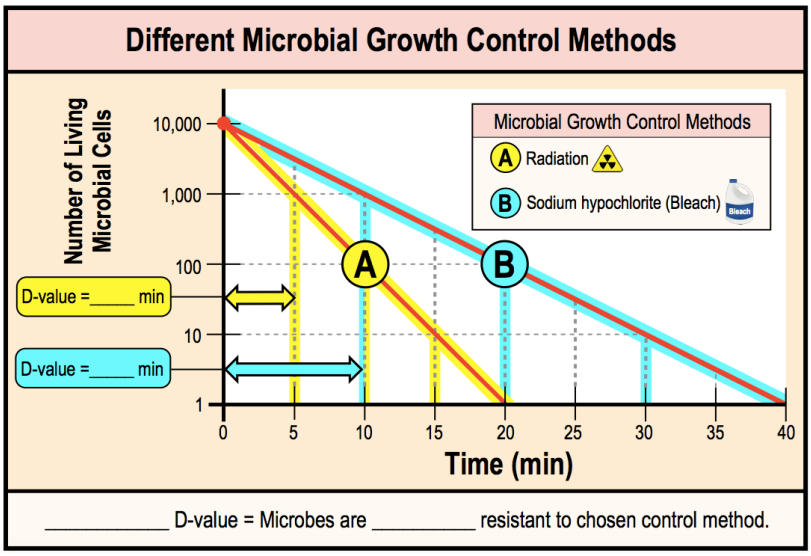
●**Microbial Death Curve**: plot of the _____ of a microbial population over time due to physical/chemical treatment.

□ **Decimal Reduction Time (___-Value)**: time required to kill ____% of a microbial population under set conditions.

□ The GREATER the D-value, the _____ *resistant* the microbial population is to the treatment method.

EXAMPLE: Effect of the Number of Microbes on the Time-To-Kill.





PRACTICE: The decimal reduction time refers to the amount of time it takes to which of the following?

a) Reduce a microbial population by 10%.
b) Reduce a microbial population by 0.1%.
c) Reduce a microbial population by 90%.
d) Completely eliminate a microbial population.

PRACTICE: Which microbial control method is most effective for killing a population of Bacteria X?

a) A microbial control method with a D-value of 1 hour.
b) A microbial control method with a D-value of 10 minutes.
c) A microbial control method with a D-value of 30 minutes.
d) A microbial control method with a D-value of 2 hours.

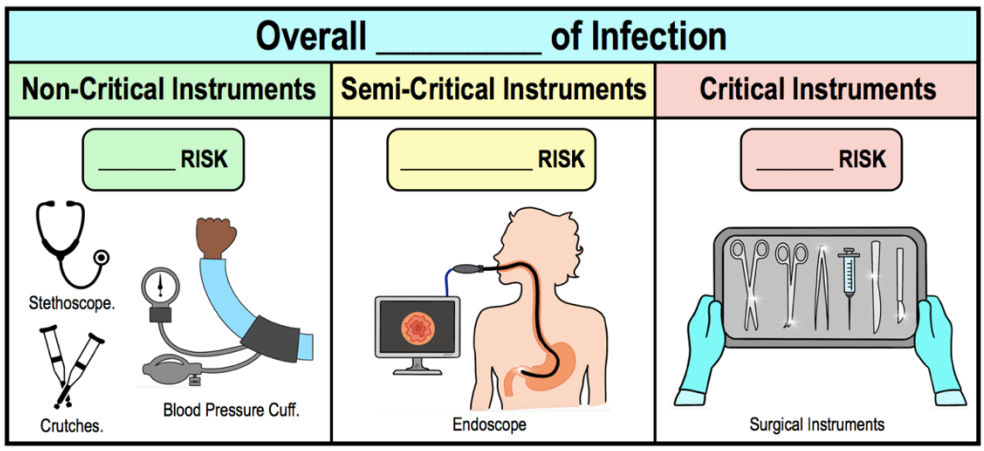
CONCEPT: SELECTING A METHOD TO CONTROL MICROBIAL GROWTH

3) Overall Risk of Infection

●The risk of _____ that a particular item presents dictates the method of controlling microbial growth.

●Medical instruments & tools are categorized into _____ groups based on their risk of infecting a patient:

1. _____**-Critical Instruments**: present a _____ risk of infection; only *low*-level disinfection.
2. _____**-Critical Instruments**: present a _____ risk of infection; require *high*-level disinfection.
3. _____ **Instruments**: present a _____ risk of infection; must be _____.

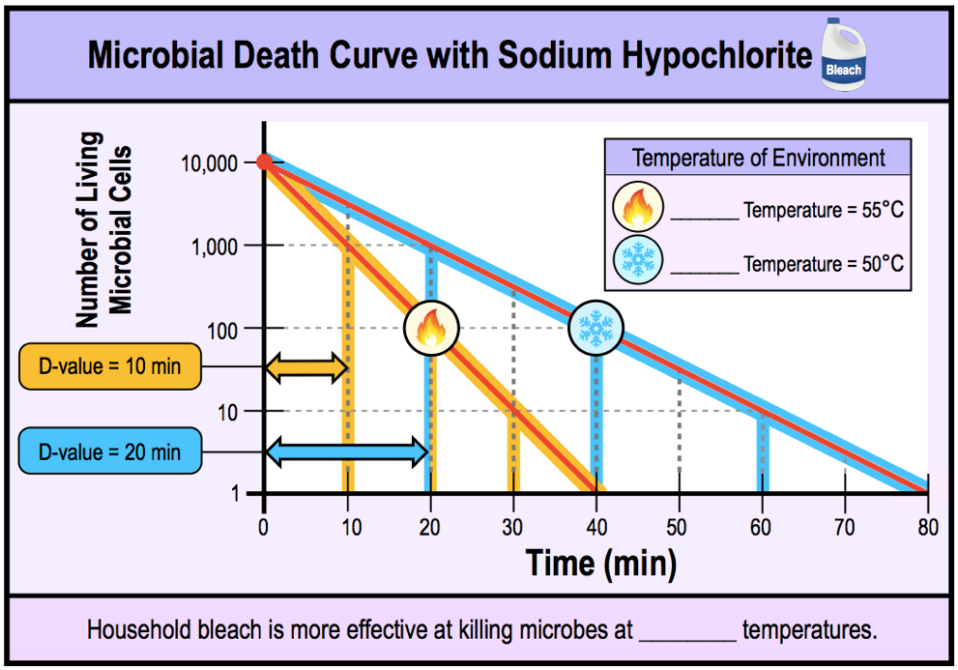


4) Environmental Factors

●Environmental factors such as _____ & _____ can influence effectiveness of growth control methods.

□ If temperature or pH ranges are not correct, then the growth control method may be _____.

□ Substances like grease, dirt & body fluids can *interfere* & should be *cleaned out* prior to disinfection/sterilization.



CONCEPT: SELECTING A METHOD TO CONTROL MICROBIAL GROWTH

PRACTICE: Match the type of instrument with its correct level of microbial infection risk.

a) Critical Instruments: High risk.
b) Non-Critical Instruments: Medium risk.
c) Semi-Critical Instruments: Low risk.
d) All are matched correctly.

PRACTICE: What can affect the effectiveness of a microbial growth control method?

a) The temperature of the environment the control method is being used in.
b) The pH of the environment the control method is being used in.
c) The presence of grease, dirt, or body fluids on the surface contaminated with microbes.
d) The type of microbe you are trying to control.
e) All of the above.

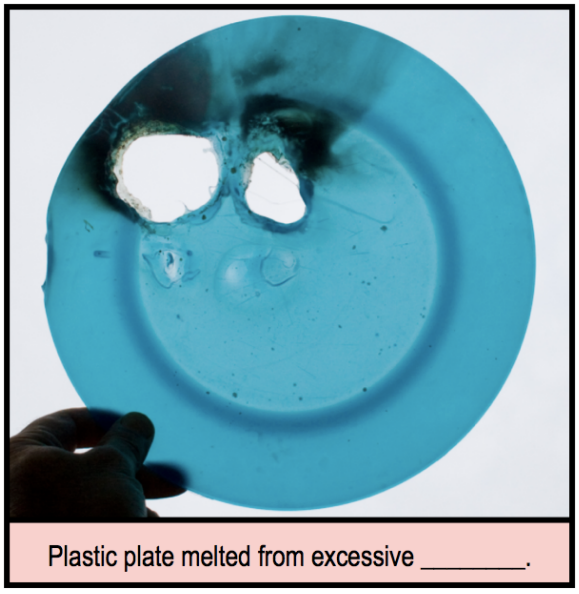
5) Composition of Item to Be Treated

●Some physical & chemical processes that control microbial growth are inappropriate for certain types of material.

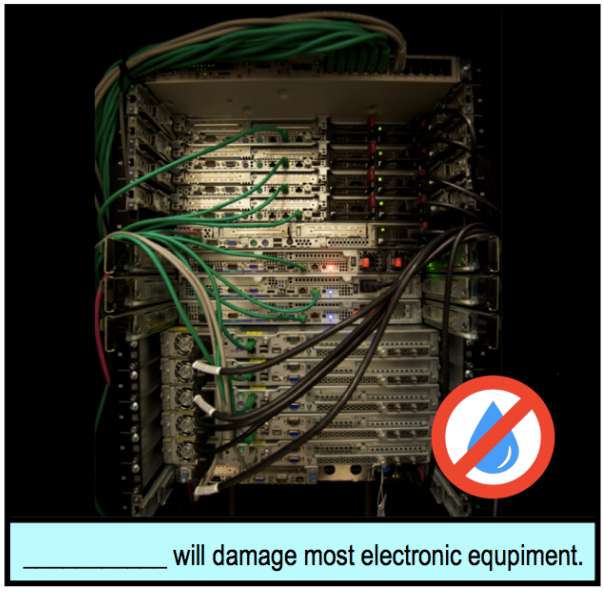
□ Some physical methods, like heat & irradiation, can cause _____ to some types of plastics.

□ _____ chemical disinfectants can damage certain materials (like electrical equipment).

EXAMPLE: The Composition of the Item Must Be Compatible with a Microbial Growth Control Method.



Plastic plate melted from excessive _____.



_____ will damage most electronic equpiment.

PRACTICE: Why must the composition of the item being treated be compatible with the microbial growth control method?

a) If the item and the control method are not compatible then the microbes will die faster.
b) If the item and the control method are not compatible then the item can be damaged by the control method.
c) If the item and the control method are not compatible then the control method will be ineffective.
d) None of the above.