Ministry of Higher Education
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University of Ishik
College of education
Department of Biology

Practical Microbiology 2018- 2019 (3rd Grade)

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Autoclave

It is a robust, electrically heated steam vessel meant for sterilizing ‘thermostable’ culture media, glassware, and other materials that are not spoiled by moist heat

In routine process, sterilization can be achieved by operating the autoclave at 121°C (15 psig) for 15 min.

2. Incubator

This an insulated, electrically heated cabinet meant for providing microorganisms with optimum temperature for growth

For routine purposes, the temperature is maintained at 28-30°C for bacteria, about 25°C for molds, and 35-37°C for mesophilic bacteria. A temperature as 2 high as 100°C can also be maintained for extremely thermophilic organisms (stereothermophiles)

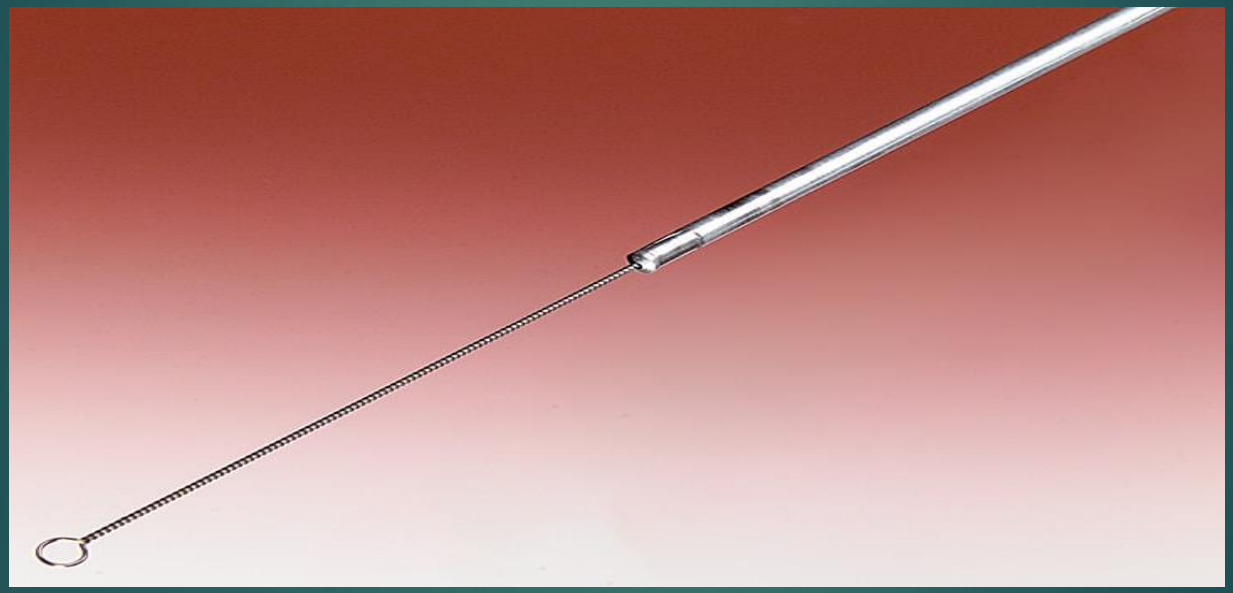
3. Hot air oven

This is similar to incubator in make except that it can operate at temperatures up to 300°C and has a fan for circulating hot air. Hot air oven is used for sterilization of glassware and materials that are spoiled by moist heat.

For routine purpose, sterilization can be achieved by running the equipment at 180°C for 1.5 hours. Hot air oven is less effective than autoclave

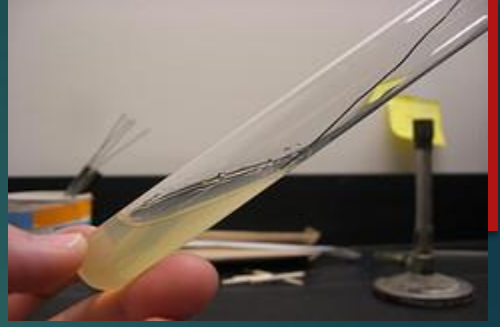
4. Inoculating loop

This is a tool for transferring and streaking cultures Inoculating needles are used for preparing ‘stab’ cultures

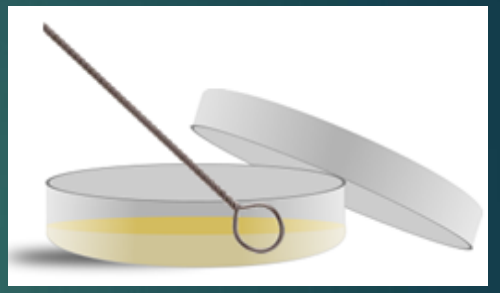


Also we have Needle,L-shaped loop,and swab

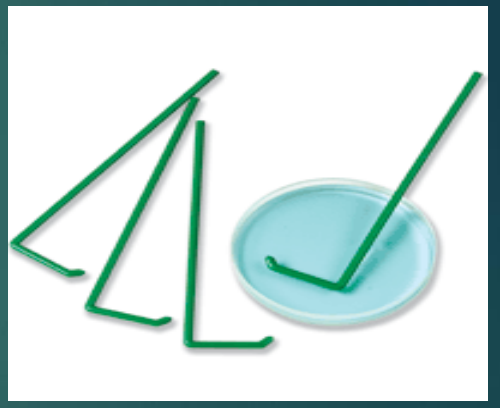
- Needle used for



- Loop used for



- L- shape used for



- Swab used for

5. Vortex mixer
This equipment is used for mixing liquids kept in a test tube

The speed of the mixer can be varied.

6. Water bath / Boiling water bath

Water bath is used for heating and melting of media, solutions, samples etc. at temperatures below 100°C

13. Microscope

It is an instrument for observing microscopic items such as cells, crystals and cell organelles

Culture Media

-The food material or substances required for growing microorganisms in vitro (outside the body) is called culture medium

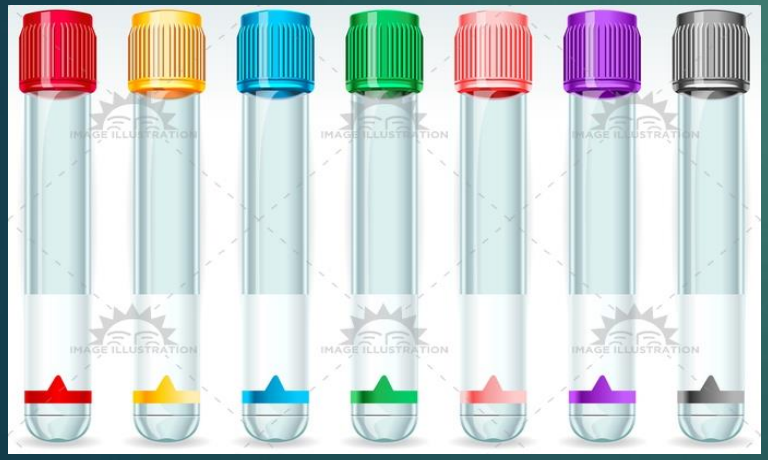
WHAT IS CENTRIFUGES ?

Centrifuge is a device for separating particles from a solution according to there size ,shape, density , viscosity of the medium

WHAT IS CENTRIFUGATION ?

Centrifugation is a process which involves the use of the centrifugal force for the sedimentation of heterogeneous mixtures with a centrifuge.

Test tube racks are pieces of equipment that are used to hold upright multiple **test tubes** at the same time



Test Tubes

A thin glass tube closed at one end, used to hold small amounts of material for laboratory testing or experiment

A **shaker** is a piece of **laboratory** equipment used to mix, blend, or agitate substances in a tube or flask by shaking them

Electronic balance

a **scale** for weighing; depends on pull of gravity.

Fume **hood**. Glove box. A biosafety cabinet (BSC)—also called a biological safety cabinet or **microbiological** safety cabinet—is an enclosed, ventilated laboratory workspace for safely working with materials contaminated with (or potentially contaminated with) pathogens requiring a **defined** biosafety level.

Spatula in laboratory

In **laboratories**, **spatulas** and microspatulas are small stainless steel utensils, used for scraping, transferring, or applying powders and paste like chemicals or treatments. Many **spatula** brands are also resistant to acids, bases, heat, and solvents, which make them ideal for use with a wide range of compound.

Mortar and pestle

A **mortar and pestle** are two tools used with each other to mill (grind) and mix substances. The **mortar** is bowl-shaped, and used to hold the substance to be ground. ... The **pestle** is a stick used for pounding and grinding.

Spectrophotometer
an apparatus for measuring the intensity of light in a part of the spectrum, especially as transmitted or emitted by particular substances.

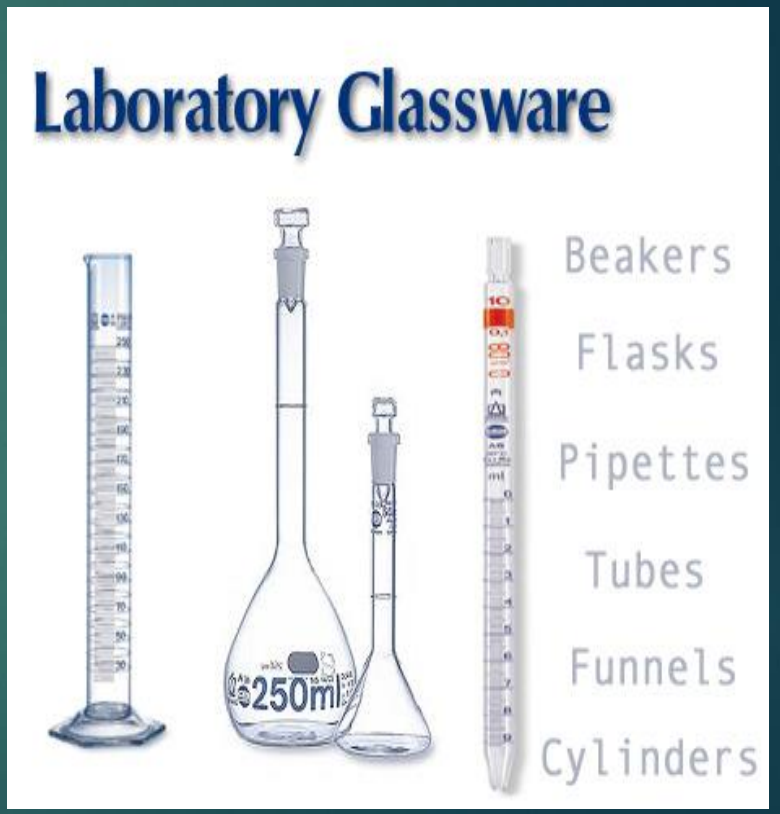
- Funnel
  A tube or pipe that is wide at the top and narrow at the bottom, used for guiding liquid or powder into a small opening

Bunsen burner

A small adjustable gas burner used in laboratories as a source of heat.

Laboratory glassware

Refers to various items which are usually made of glass and used for scientific work in chemistry and biology **laboratories**. ... Pipettes, petri dishes, and test tubes are **examples** of **laboratory glassware**.



Sterilization

Sterilization (or **sterilization**) refers to any process that eliminates, removes, kills, or deactivates all forms of life and other **biological agents** (such as fungi, bacteria, viruses, spore forms, prions, unicellular eukaryotic organisms such as Plasmodium, etc.) present in a specified region, such as a surface, a volume of fluid, medication, or in a compound such as biological culture media.

Disinfection uses antimicrobial agents on non-living objects or surfaces to destroy or inactivate microorganisms. Disinfectants may not kill all bacteria, viruses, fungi and spores. Most disinfectants are weakened or inactivated by organic matter such as dirt and feces

Sanitation uses an antimicrobial agent on objects, surfaces or living tissue to reduce the number of disease-causing organisms to non-threatening levels. Sanitizing does not affect some spores and viruses. A practical method of sanitizing hands is to wash them with soap under running hot water for at least 20 seconds.

Sterilization is using chemicals, temperature, gas and/or pressure to kill or inactivate all disease-causing bacteria, spores, fungi and viruses.

https://articles.extension.org/pages/39791/what-is-the-difference-between-disinfection-sanitation-and-sterilization

Antiseptic is the medicine like substance that is used in human and animals to protect them from germs or kill the existing microorganisms in their body, whereas **Disinfectant** is the medicine or a cleansing substance that is used on the non-living things like house and household products.

Antiseptic	Disinfectant
Used for humans and animals	Used for non-living things like furniture and other household items
Commonly found in healthcare centers or hospitals	Commonly found in homes or public places
Cleanses wounds and surgical sites to prevent infection and other complications	Kills microorganisms on the surface of non-living things
Includes mouthwash and cold sore and yeast infection treatment creams	Includes cleaning products for houses and public places
Transports through the lymphatic system and destroys bacteria within the human body	Destroys the cell wall of microorganisms or interferes with the metabolism of microbes thriving on the surface of tangible objects
Not harmful to humans and animals	Harmful to humans and animals

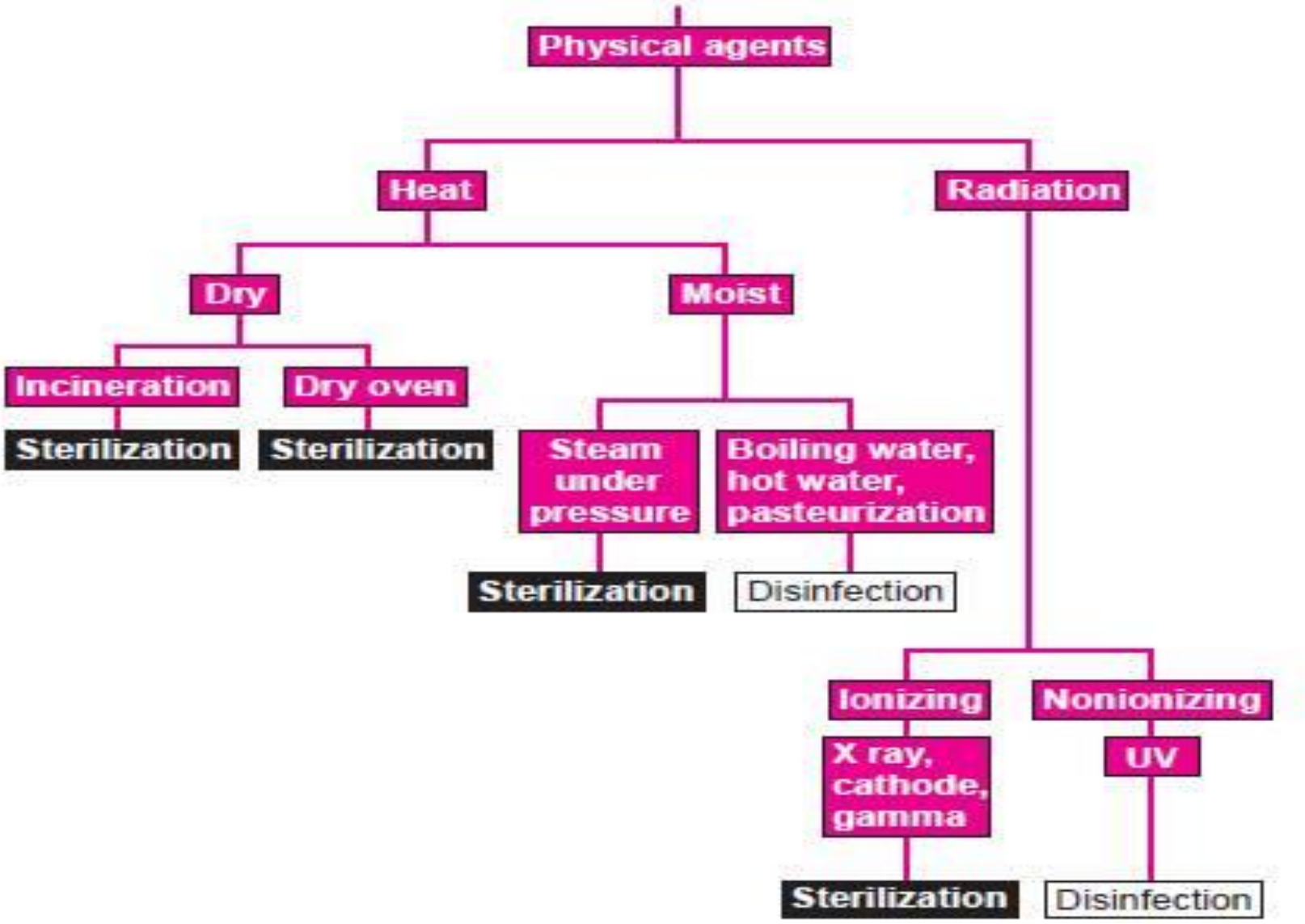
Microbial control methods

1. Physical agents

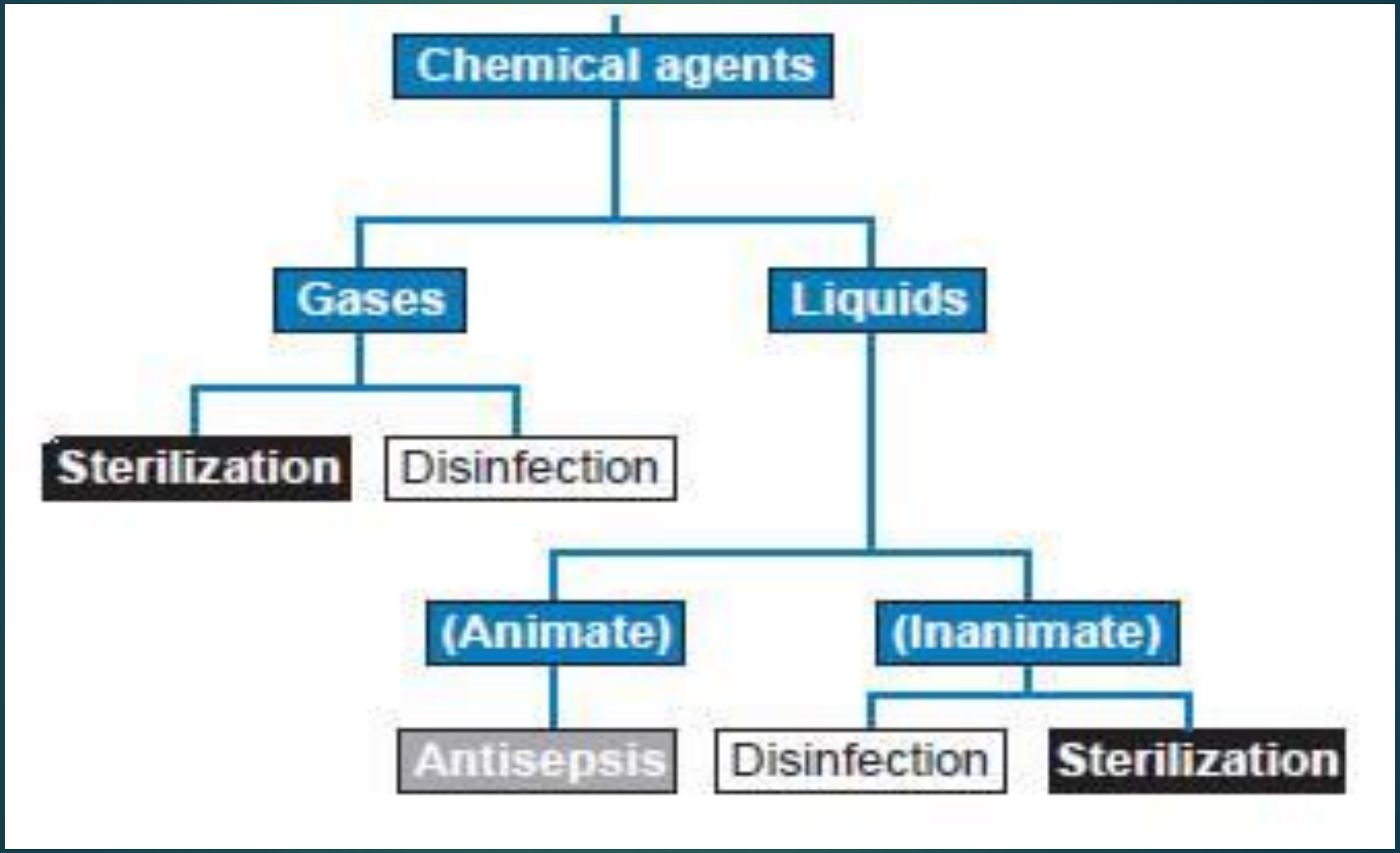
2. Chemical agents

3. Mechanical removal methods

Physical agents



Chemical agents



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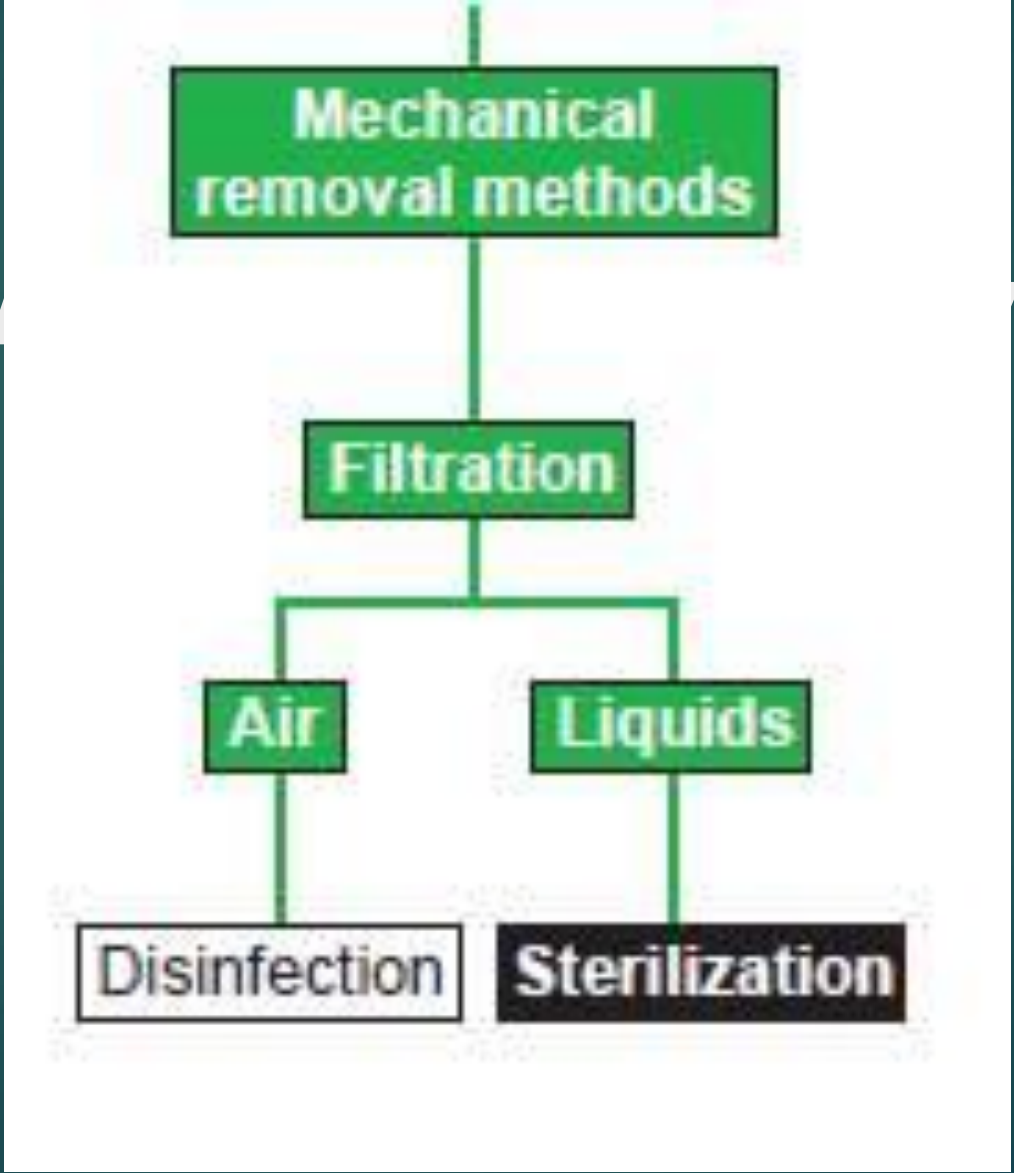
Mechanical removal methods
Filtration
Air
Liquids
Disinfection
Sterilization

Disinfectant

Antiseptics

Sterilization


Sanitization
Lysol
Purell
HAND
SANITIZER


Sanitize
Kills some bacteria and viruses
Disinfect
Kills most bacteria and viruses
Sterilize
Kills or inactivates all bacteria and viruses
SPEED CLEANING
SpeedCleaning.com

Pasteurization
is the process of heat processing a liquid or a food to kill pathogenic bacteria to make the food safe to eat

Products That Can Be Pasteurized	
Foods	**Liquids**
Butter	Milk
Cheese	Honey
Cream Cheese	Vinegar
Sour Cream	Fruit Juices
Yogurt	Cider
Ice Cream	Lemon Juice
Nuts	
Sauerkraut	
Eggs	
Lobster meat	
Crab meat	

Requires temperatures of **about 63° C** (**145° F**) maintained for 30 minutes or, alternatively, heating to a higher temperature, **72° C** (**162° F**), and holding for 15 seconds (and yet higher temperatures for shorter periods of time).

ANY QUESTIONS ¿¿¿¿¿¿¿¿¿¿