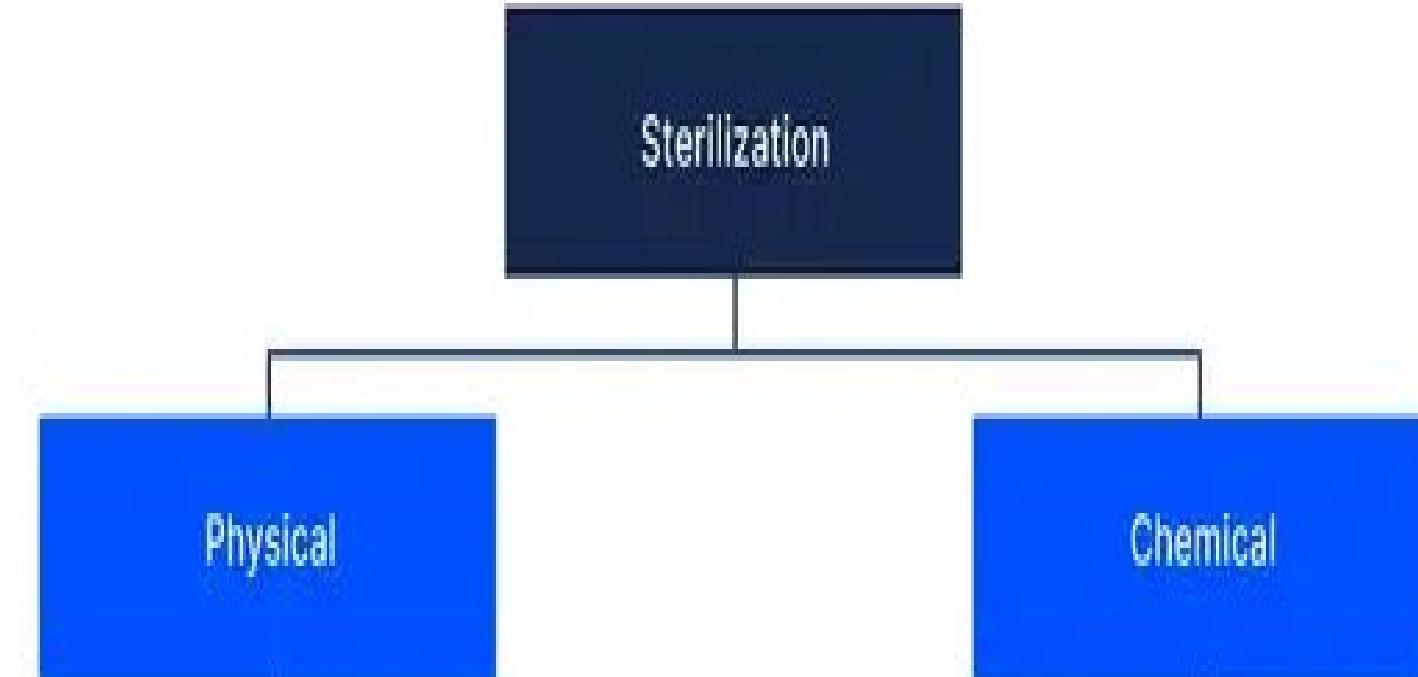


# **SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES**

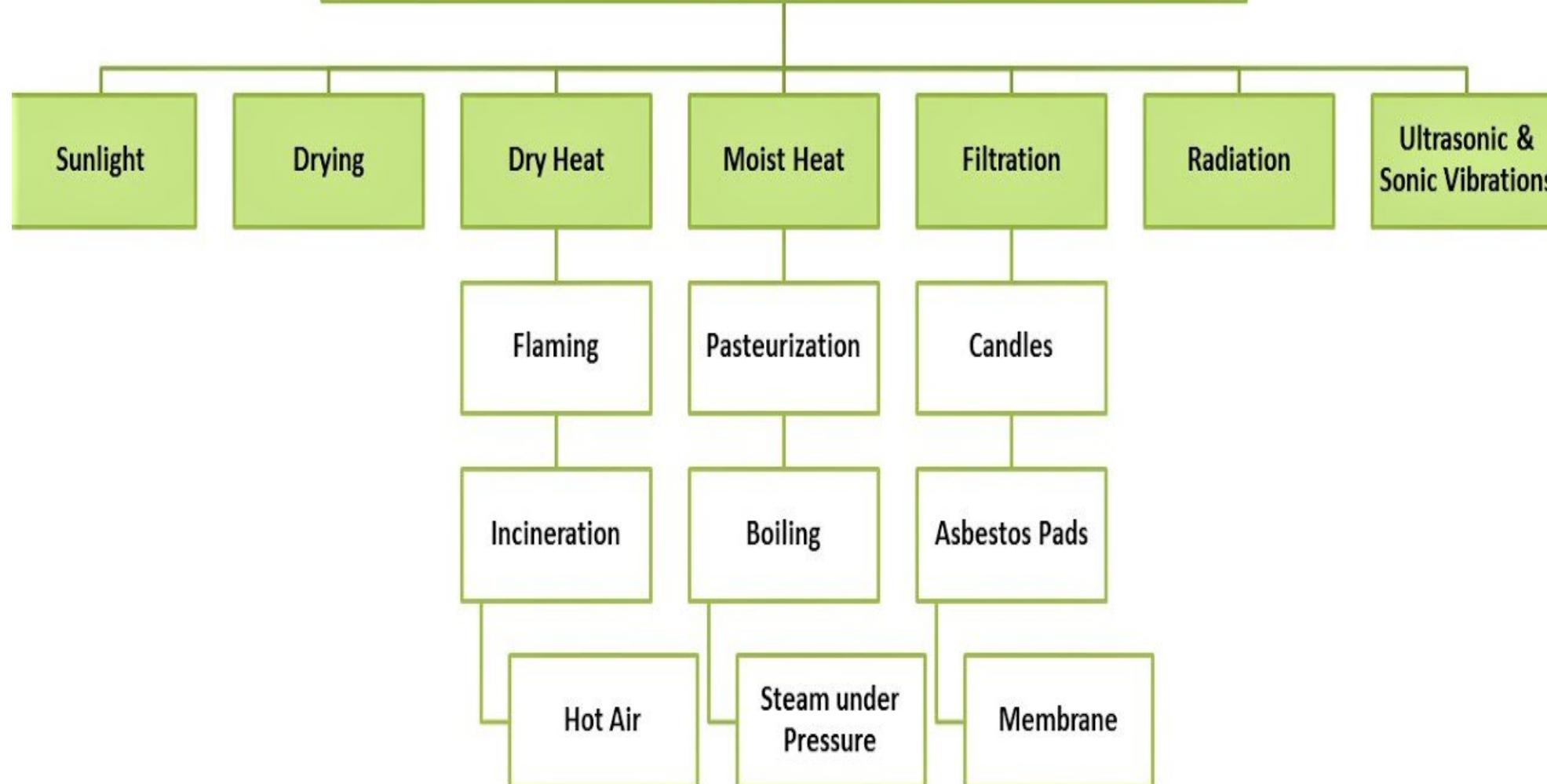
*Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai  
Approved by Pharmacy Council of India, New Delhi.  
Coimbatore -641035*

**COURSE NAME : PHARMACEUTICAL MICROBIOLOGY - BP303 T  
B.PHARM II YEAR / III SEM  
UNIT 2**

**SUB TOPIC : STERILIZATION METHODS, EFFICIENCY AND INDICATORS**



# Physical Method of Sterilization



Hot air oven



incinerator



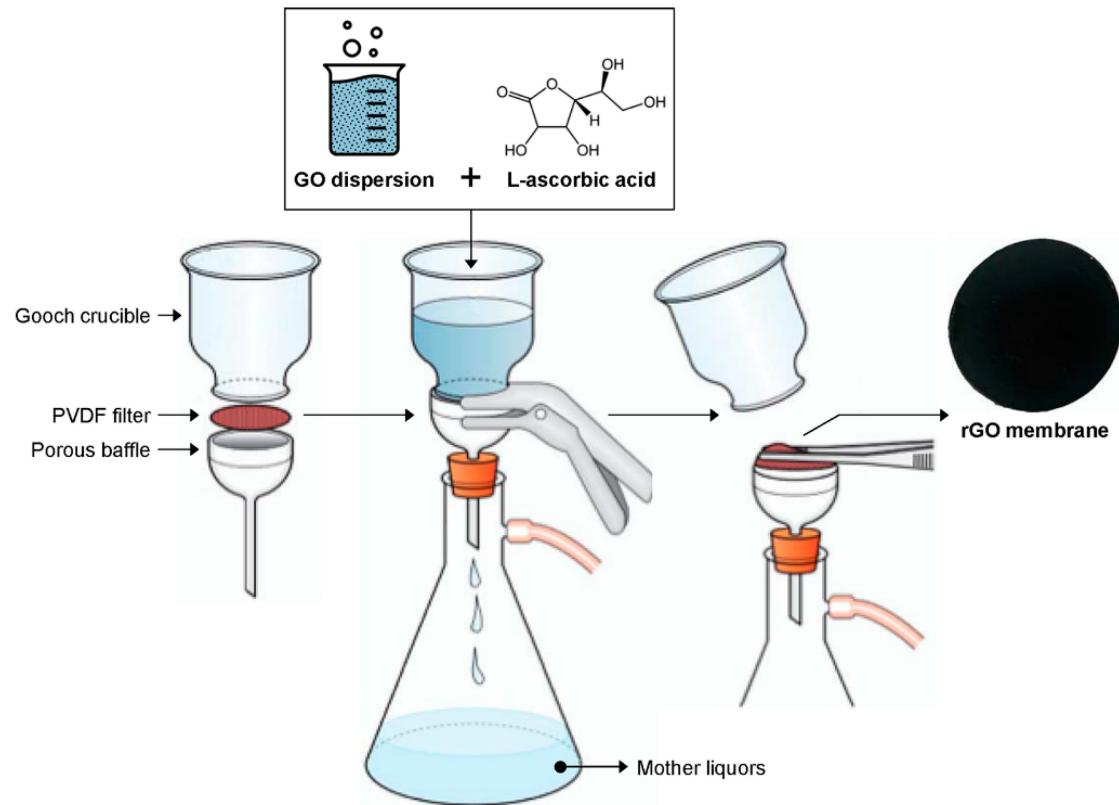
Autoclave



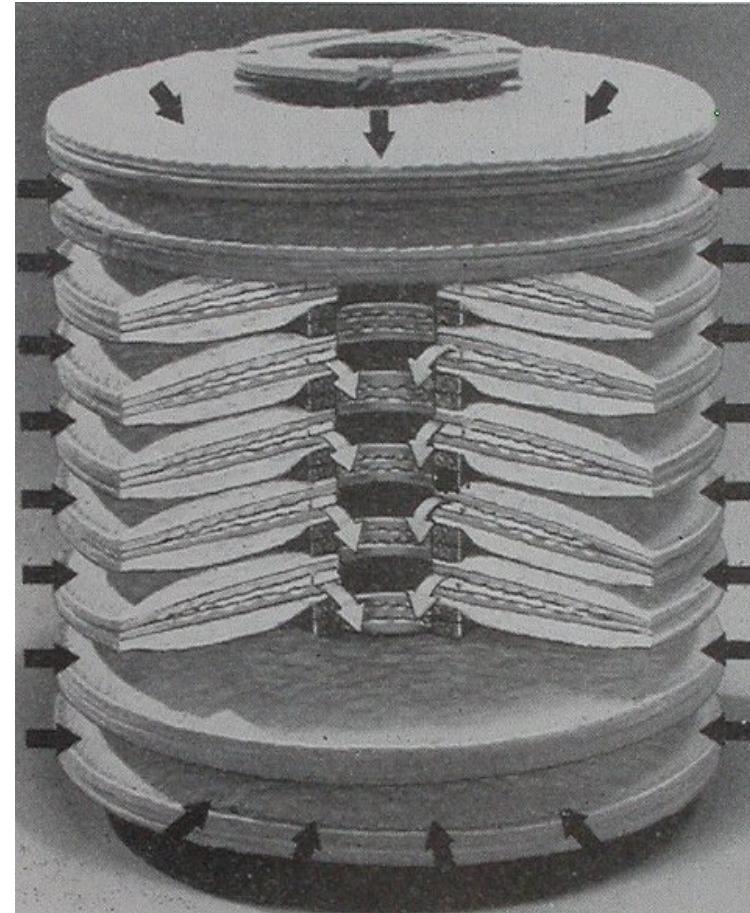
Pasteurization  
machine



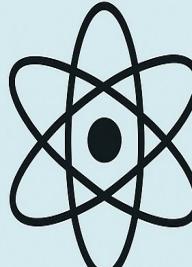
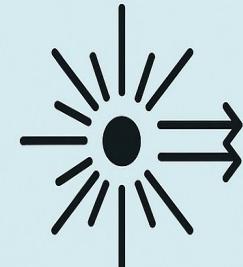
## Membrane filter



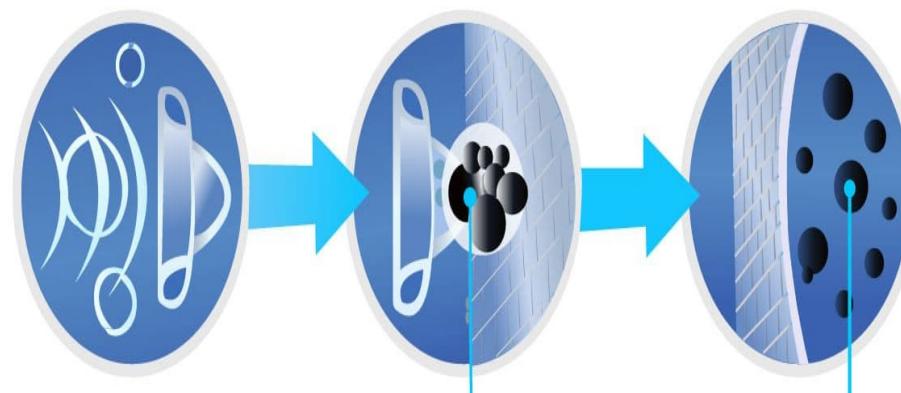
Asbestos  
pads



## TYPES OF RADIATION STERILIZATION IN PHARMACEUTICALS

		
<b>GAMMA RAYS</b>	<b>ELECTRON BEAM</b>	<b>X-RAYS</b>

## Ultrasonic Cleaning Principle

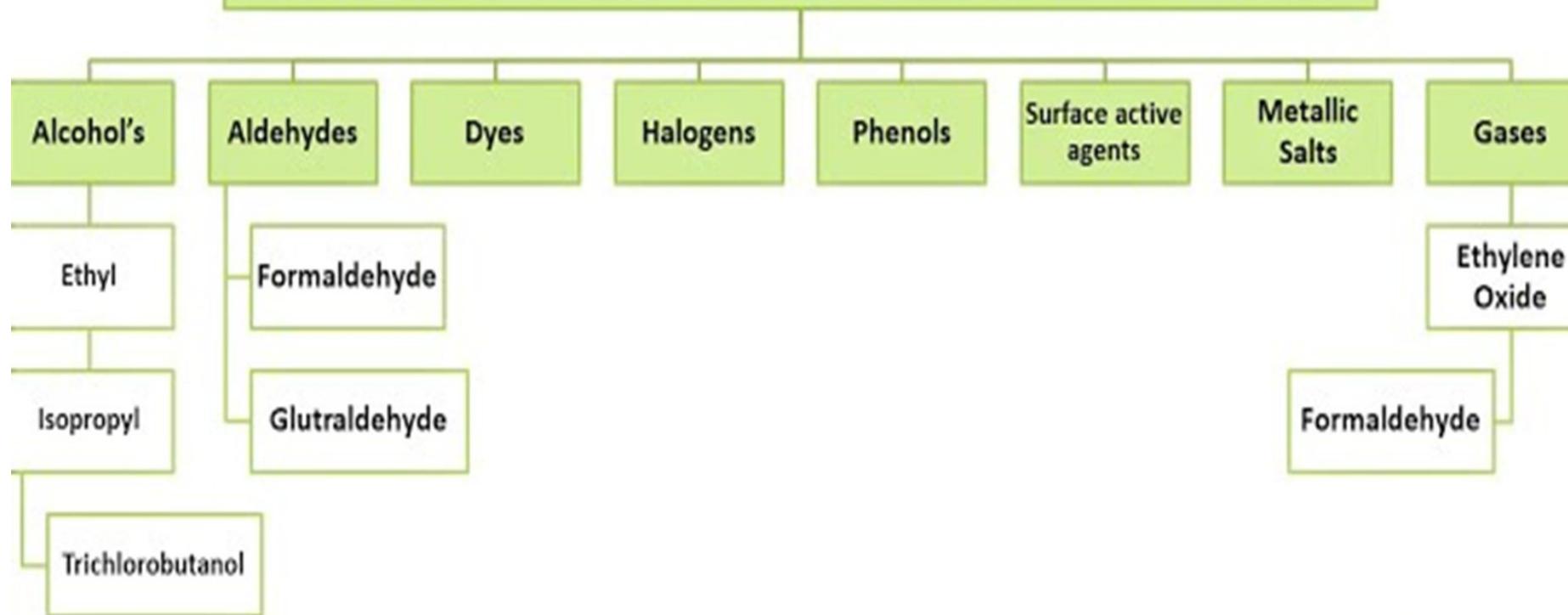


Ultrasonic vibration  
producing high speed

Voids explode on  
the surface of the fabric

The implosion  
disintegrated the debris

# Chemical Method of Sterilization

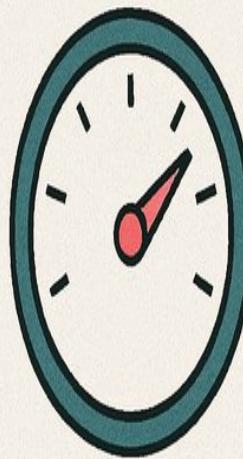
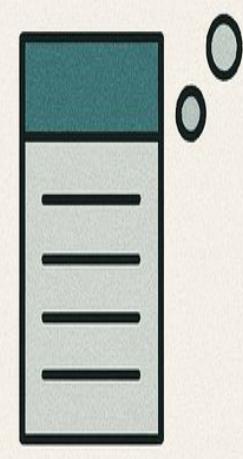




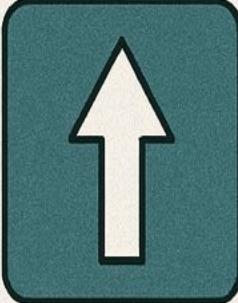
## EVALUATION OF THE EFFICIENCY OF STERILIZATION METHODS

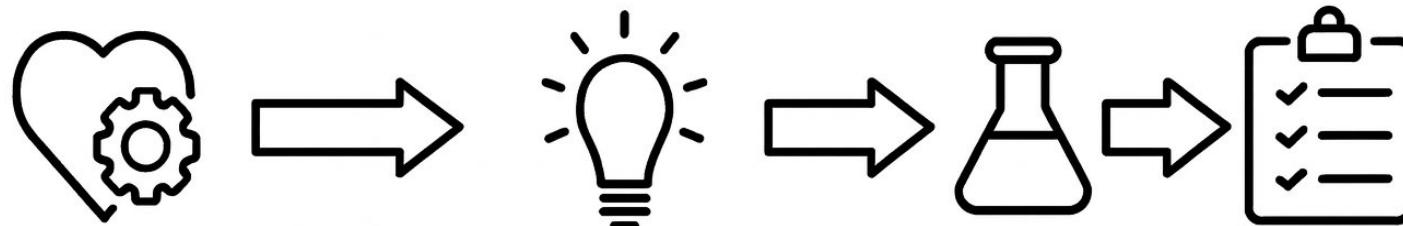
Method	Indicator	Efficiency
Moist heat	<i>Geobacillus stearothermophilus</i>	Very high
Dry heat	<i>Geobacillus stearothermophilus</i>	High
Filtration	Pore size (0,2 µm)	Medium
Radiation	<i>Bacillus pumilus</i>	High

## Monitoring methods

THERMOCOUPLES	PRESSURE	HUMIDITY LOGS	BUBBLE POINT TEST
			

# KEY METRICS FOR HEAT STERILIZATION

D-VALUE	Z-VALUE	F-VALUE
		



## Empathize

Understand the needs of healthcare workers, lab technicians, and facility managers. Interview hospital staff about sterilization challenges (e.g., time, safety). Observe processes in clinics or food industries to identify inefficiencies. Empathize with users needing reliable, safe sterilization methods.

## IDEATE

- Brainstorm creative sterilization methods.
- Eco-friendly steam sterilization with reduced water use.
- Portable UV radiation devices for small-scale use.
- Non-toxic chemical sterilization for sensitive equipment.

## Prototype

- Create testable models of new sterilization methods.
- Develop a low-energy steam sterilization protocol.
- Build a handheld UV sterilization wand.

## Test

- Evaluate prototypes in real world settings and refine.
- Test methods in hospitals or labs for effectiveness and safety.
- Gather feedback on usability and speed from users.
- Iterate to improve efficiency and reduce costs.

### Question 1

## The Steam Zap Challenge

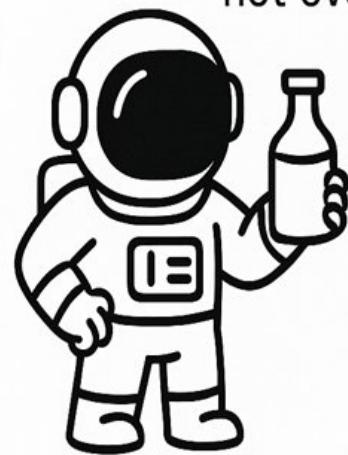
Professor Sparkle needs to clean a pile of surgical tools in a hospital. She wants to use super-hot steam under pressure to kill all germs. Which sterilization method should she choose?



- a)** Dry Heat Sterilization
- b)** Steam Sterilization
- c)** Radiation Sterilization
- d)** Chemical Sterilization

## Question 2: The Fire Oven Mission

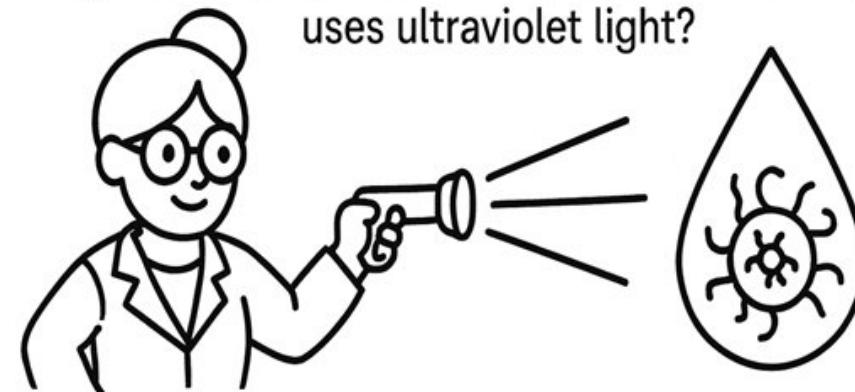
The Crew has to sterilize glass bottles that can handle high heat without water. Which method uses a blazing hot oven to burn germs away?



- a) Filtration Sterilization
- b) Dry Heat Sterilization
- c) Gas Sterilization
- d) Steam Sterilization

## Question 3: The Light Beam Battle

In Sparkle City's water factory, germs are hiding in the water. Professor Sparkle decides to use powerful light rays to destroy them. Which sterilization method uses ultraviolet light?



- a) Chemical Sterilization
- b) Radiation Sterilization
- c) Dry Heat Sterilization
- d) Filtration Sterilization

## THE GAS CLOUD QUEST

Some delicate tools can't handle heat or water, so the Crew uses a special gas to wipe out germs. Which method uses a gas like ethylene oxide to sterilize equipment?



- a) Steam Sterilization**
- b) Gas Sterilization**
- c) Radiation Sterilization**
- d) Dry Heat Sterilization**

## THE FILTER TRAP ADVENTURE

The Crew needs to make a big batch of liquid medicine germ-free without using heat or chemicals. Which method uses super-fine filters to trap bacteria?



- a) Filtration Sterilization
- b) Steam Sterilization
- c) Dry Heat Sterilization

## REFERENCES :

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2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Ananthanarayan : Text Book of Microbiology, Orient-Longman, Chennai

