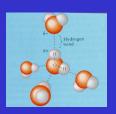
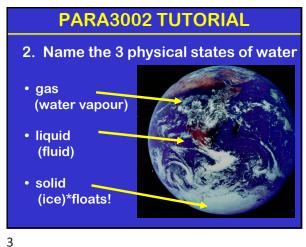


## **PARA3002 TUTORIAL**

- 1. What is unique about dihydrogen monoxide!
- · asymmetrical molecule
- polar charge
  - cohesion (binding)
  - adhesion (wetting)





**PARA3002 TUTORIAL** 

3. Why is water the fluid of life?

Universal solvent dissolves:

• salts

4

2

- sugars
- proteins
- nucleotides [but not fat]

Cells composed of 70-95% water

## **PARA3002 TUTORIAL**

- 4. What parameters are used to indicate water quality?
- physical (turbidity, temp, hardness, conductivity)
- chemical (pH, organics, inorganics, electrolytes, gases, metals...)
- biota (viruses, bacteria, fungi, protista, metazoa)

abiotic

biotic

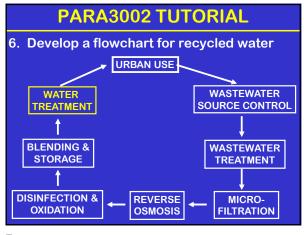
**PARA3002 TUTORIAL** 

- 5. What are the 4 major sources of water contamination?
- human waste (sewage)
- animal waste (agricultural run-off)
- domestic waste (effluent)
- industrial waste (effluent)



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**PARA3002 TUTORIAL** 7. Develop a flowchart for wastewater treatment Wastewater Screening Raw wastewate Sludge (insoluble) Soluble liquid Primary treatmen Activated Oxidation -b Trickling Digested sludge: drying; incineration; use as fertilizer, or Disinfection Secondary treatment Aeration Treated effluent to stream 9

**PARA3002 TUTORIAL** 

- 8. Name 4 processes to decontaminate water (i.e. remove contaminants)
  - sedimentation (tank, reservoir)
  - flocculation/coagulation (alum)
  - filtration (sand, membrane, micro)
  - adsorption (carbon)

10

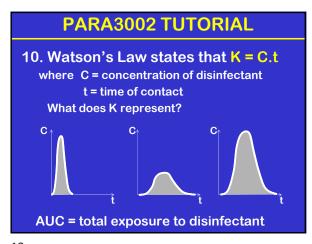
## **PARA3002 TUTORIAL**

- 9. Name three processes to disinfect water (i.e. kill contaminants)
  - · heat (boil, solar)
  - chemical (chlorine, chloramine, chlorine dioxide, ozone)
  - energy sources (UV, gamma, X-ray, high energy electron sources)

Remove **Drinking** sand, gravel, Raw water large **Sedimentation** Water particulates Form and remove floo **Treatment** Coagulatio containing insoluble material and microorganisms remove/kill Remove all remaining contaminants particulates, organic Filtratio and inorganic compounds improve quality, hygiene, colour, Kill remaining micro-Chlorination organisms taste, odour Prevent growth of nev Storage inocula Finished water Distribution

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13 1