Our Fresh Water Resources

Where does our water come from?

Why is clean water important?

Water Services Department

Outline

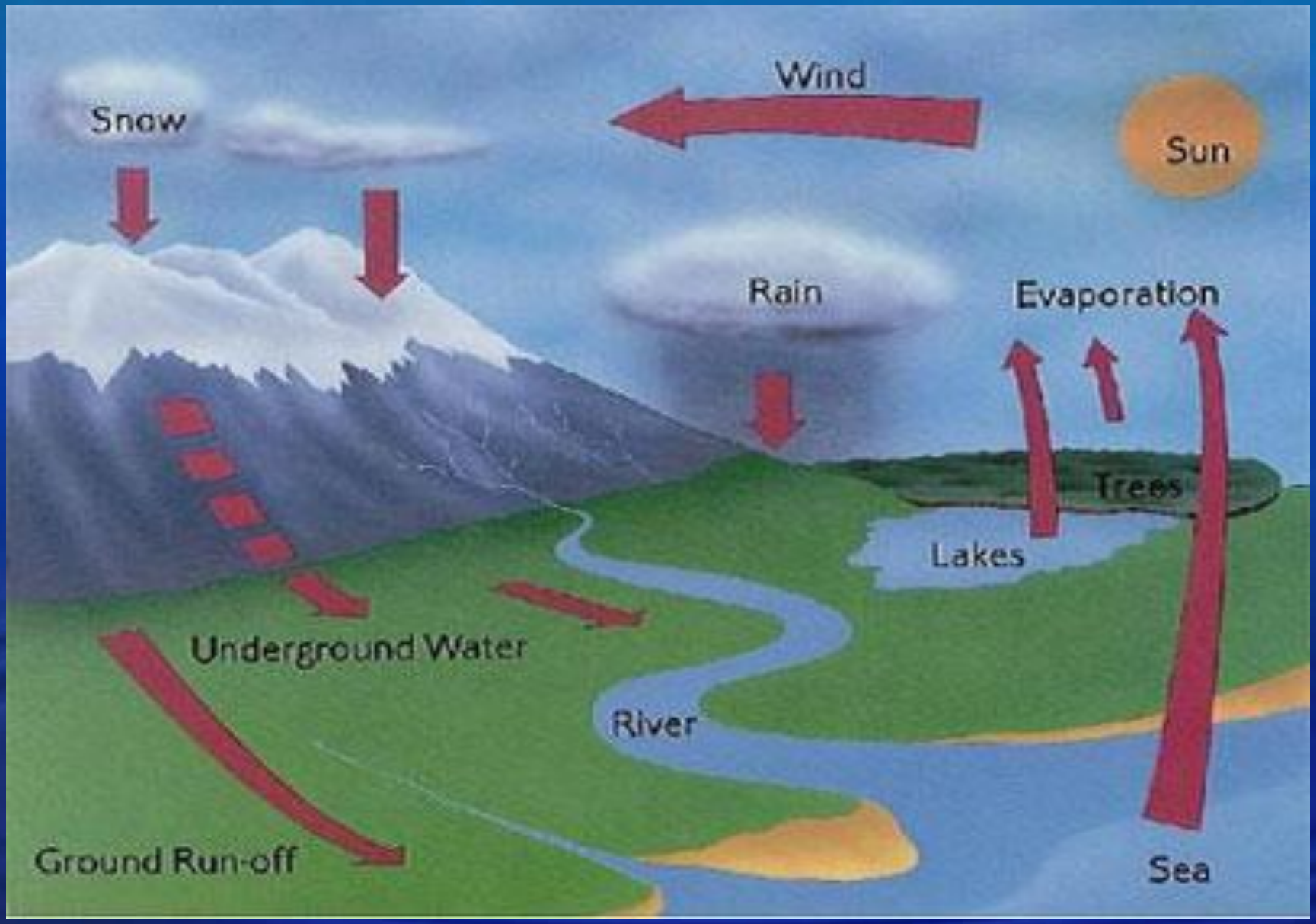
- TOPIC #1: Where does our water come from?
  - The water cycle
  - Surface vs. Groundwater

Outline

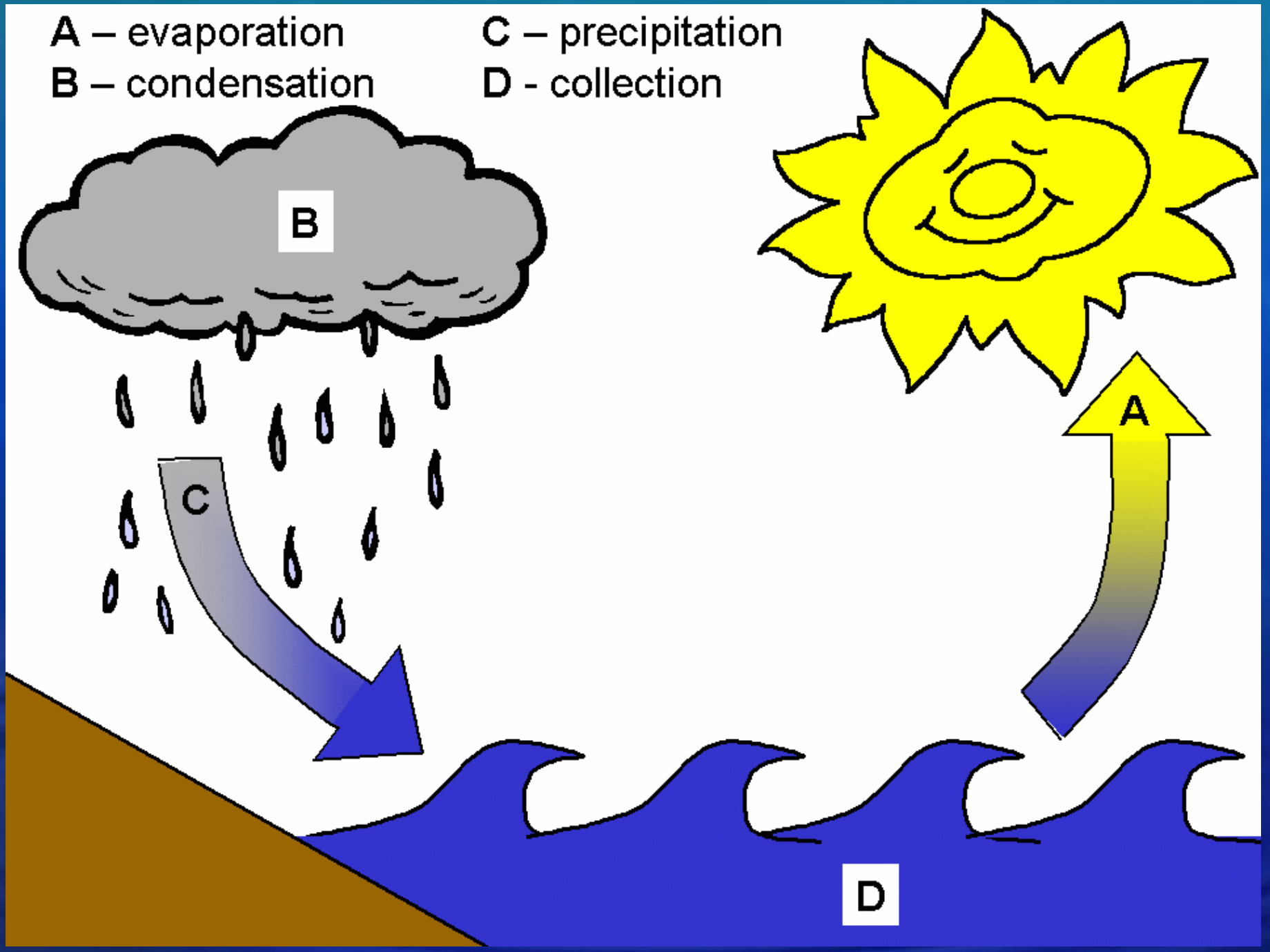
- TOPIC #2: Importance of clean water
  - Causes and effects of water pollution
  - Water treatment

Where does our water come from?

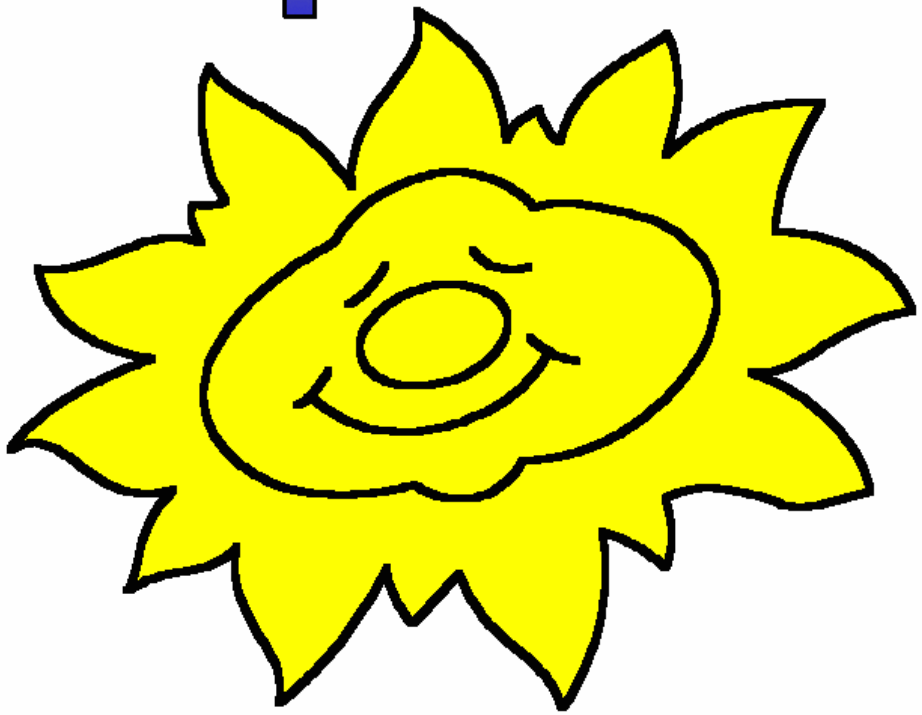
Topic #1: The Water Cycle



A – evaporation
B – condensation
C – precipitation
D - collection

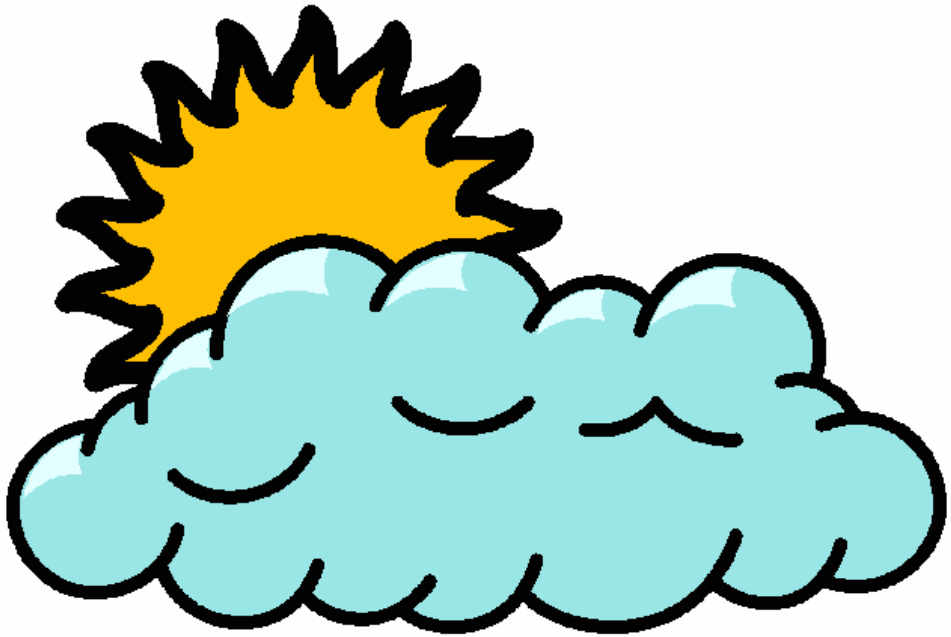


Evaporation



Evaporation is when the sun heats up water in rivers or lakes or the ocean and turns it into vapor or steam. The water vapor or steam leaves the river, lake or ocean and goes into the air. Make your own evaporation. With an adult's help, heat some water in a kettle. Watch closely! Do you see the steam rising? That's evaporation!

Condensation



Water vapor in the air gets cold and changes back into liquid, forming clouds. This is called condensation.

To see condensation in action, put a large (at least 8 ½ x 11) piece of cardboard (a book will work) in the freezer for about an hour. Now, take the boiling kettle of water and hold the cold book about 1 foot over the spout (right in the steam… wear oven mitts). Water droplets will form on the book. That's condensation!

Precipitation

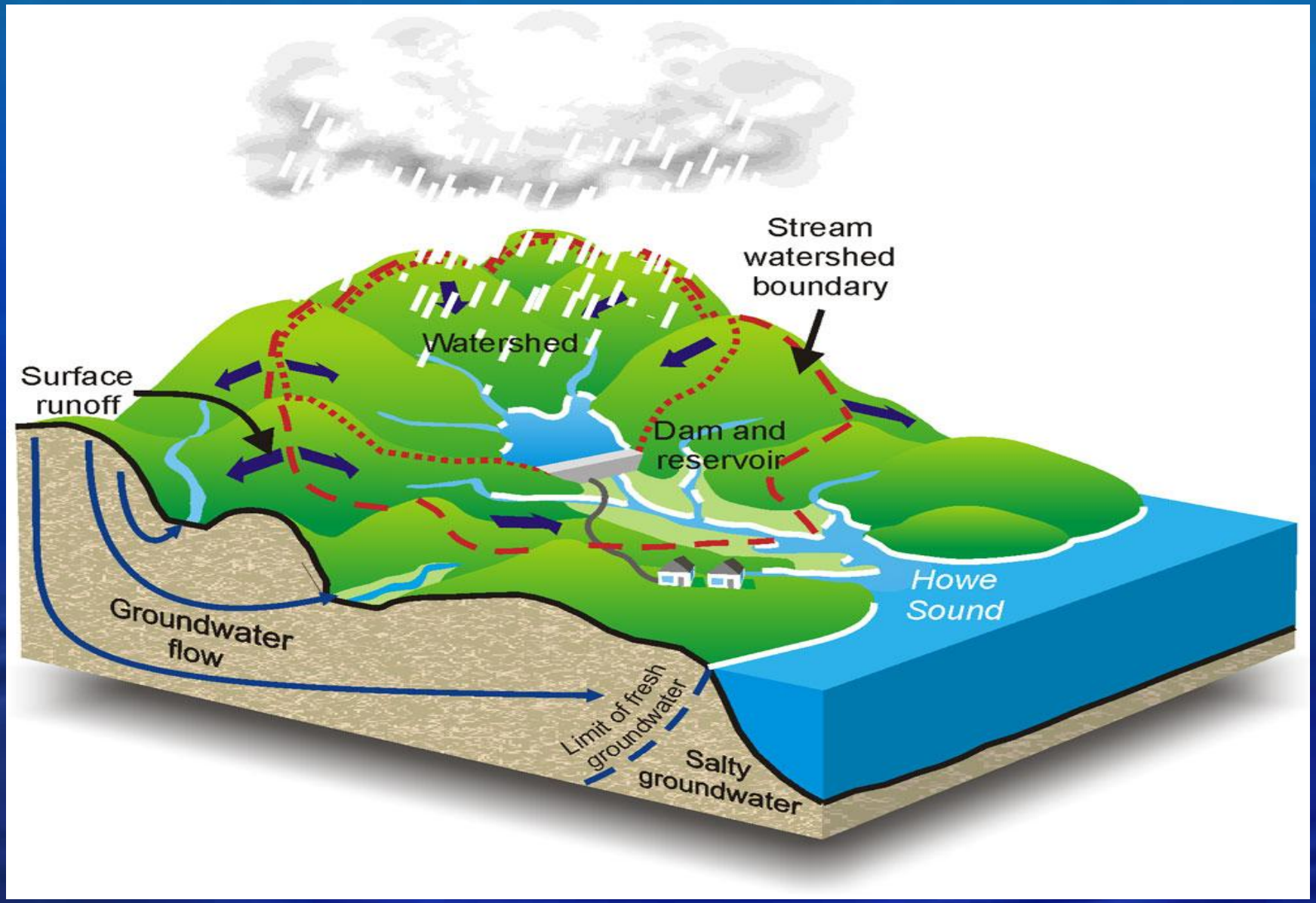
Precipitation occurs when so much water has condensed that the air cannot hold it anymore. The clouds get heavy and water falls back to the earth in the form of rain, hail or snow.

If you continue the condensation experiment long enough, so much water will condense on the book that it won't be able to hold it all. At that point, water will start dripping down from the book and you've created precipitation!

Collection

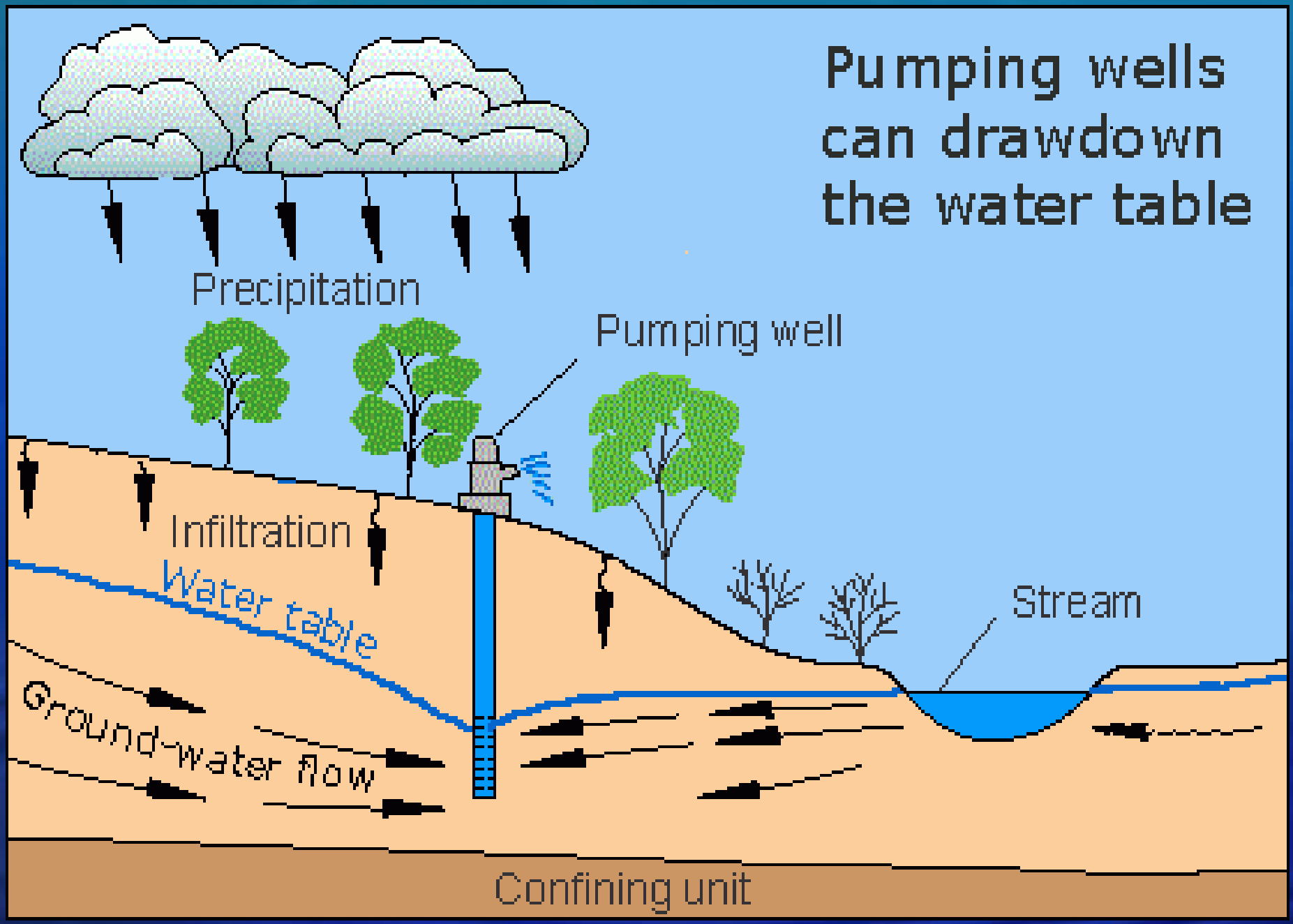
When water falls back to earth as precipitation, it may fall back in the oceans, lakes or rivers or it may end up on land. When it ends up on land, it will either soak into the earth and become part of the “ground water” that plants and animals use to drink or it may run over the soil and collect in the oceans, lakes or rivers where the cycle starts all over again.

Groundwater vs. Surface water



Link between land and water

- The land and water and CLOSELY linked especially on our SMALL ISLANDS
- What happens on the land impacts our coastal and ground water!
  - What kinds of land use do you think would impact our beaches and coast line?
  - Erosion and agricultural use of pesticides and fertilizers
  - Improper disposal of sewage
  - Industrial outfalls


Pumping wells can drawdown the water table
Precipitation
Pumping well
Infiltration
Water table
Stream
Ground-water flow
Confining unit

St. Kitts - Groundwater

- Groundwater represents about 65-70% of our water supply
- Network of 29 shallow wells
- Supply approximately 4 MGD (2 MGD from the Basseterre Valley Aquifer)
- Depth to aquifers
  - 2 m near the coast (20 m to groundwater/saltwater interface)
  - Up to 70 m further inland
- Coastal aquifers are crucial and need protection

St. Kitts - Groundwater

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St. Kitts – Surface Water

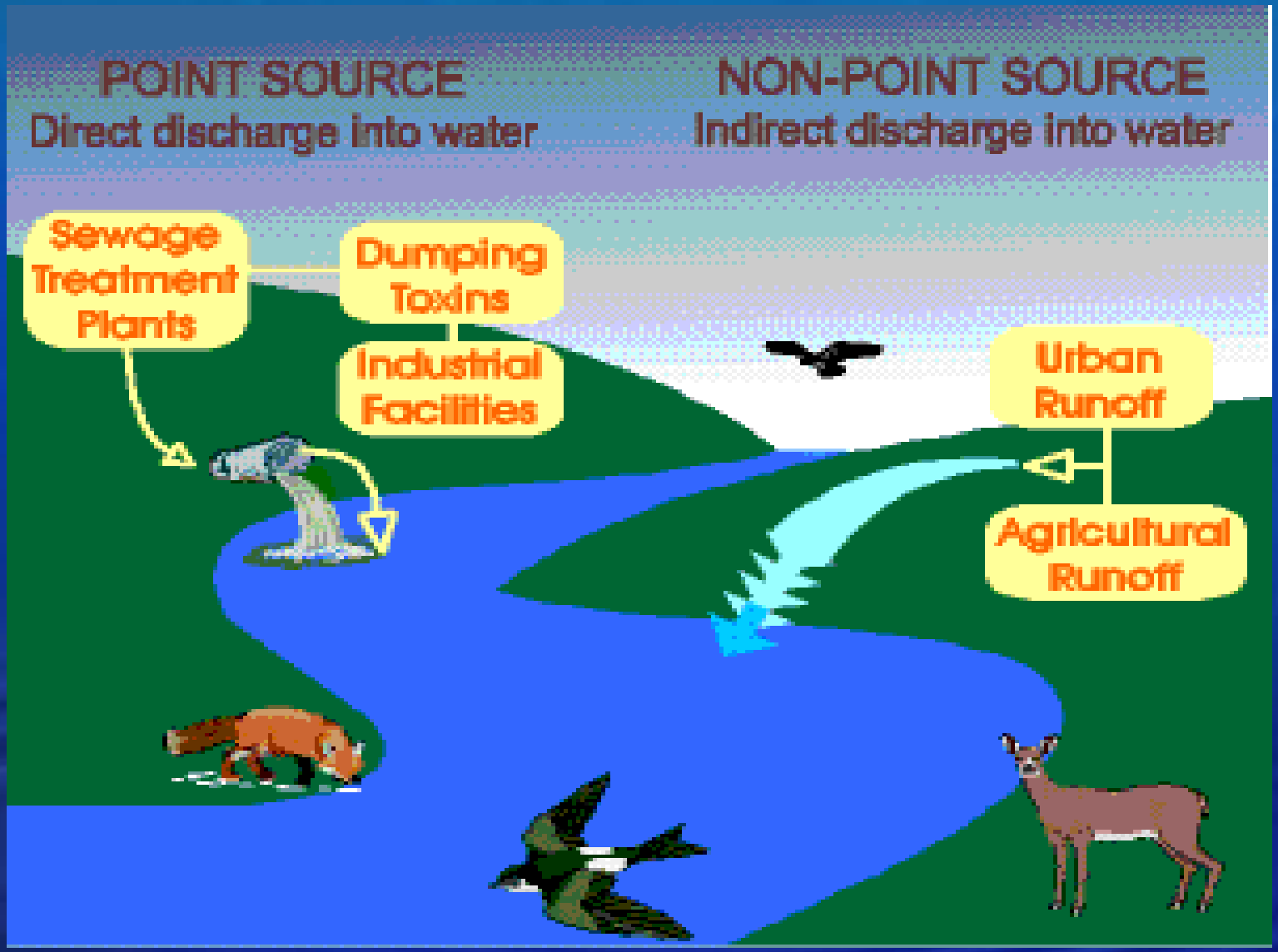
- Surface water (i.e. springs) account for about 2 MGD
- Springs are fed by rain
- Concrete intakes are constructed to capture the water and direct via pipeline into the system
- All water is stored in reservoirs before distribution
- Total storage capacity is 7 MG

St. Kitts – Surface Water

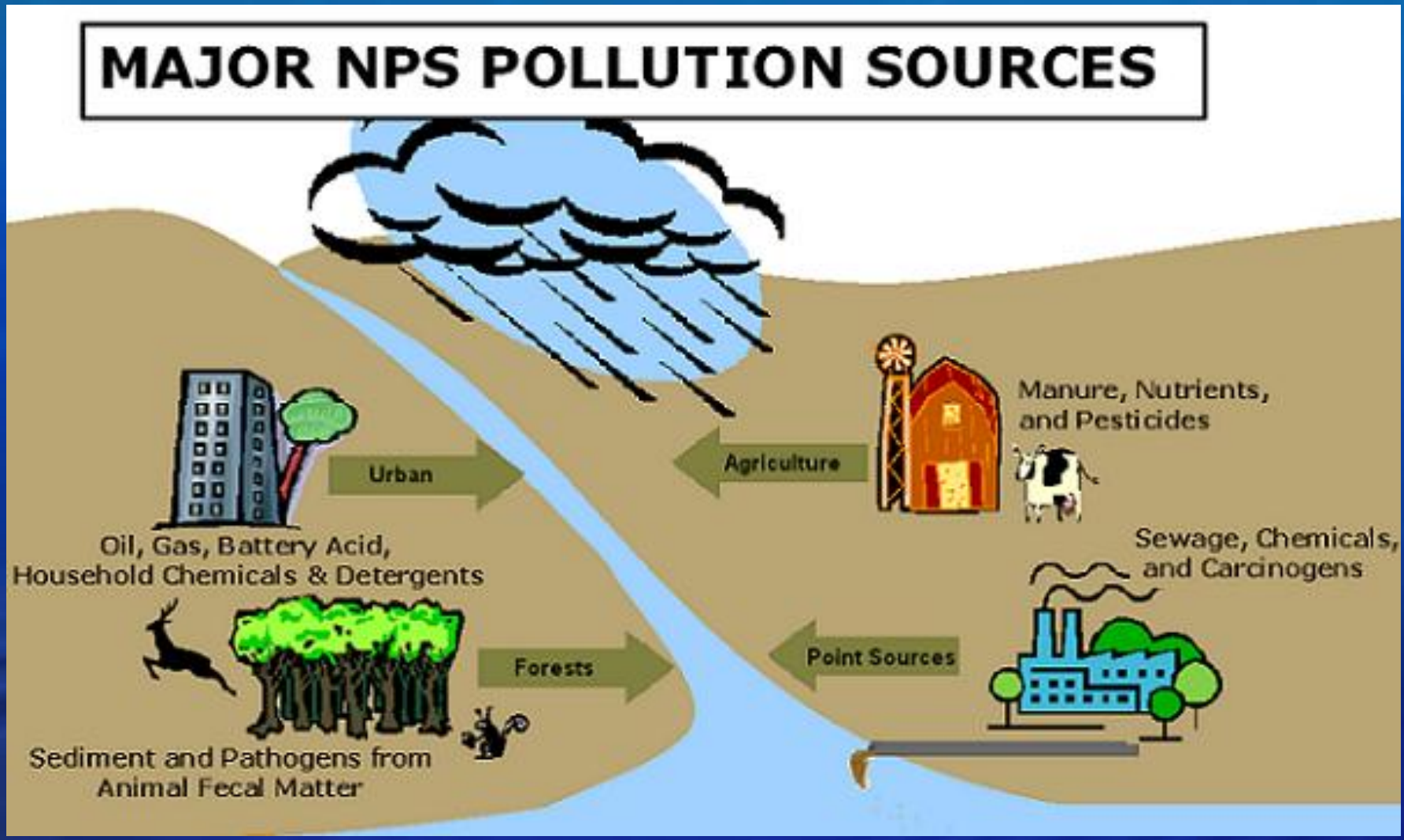

Dieppe Bay
Parson Ground
Lynches
Sadlers
Newton Ground
Tabernacle
Mansion
Molineux
Phillips
Lodge
Ottleys
Phillips Intake 900FT
Sandy Point Town
Cayon
New Guinea
Keys
Intake 1650FT
Cayon Intake 1600FT
Half Way Tree
Middle Island
Old Road
Wingfield Intake 500FT
Franklands Intake 1500FT
Stone Fort Intake 1000FT
Canada Estate
St. Peters
Conaree
Shadwell Estate
Trinity
Boyds
Mattingley
West Farms
Camps
Basseterre
Frigate Bay

Importance of clean water

Sources of water pollution



Sources of water pollution



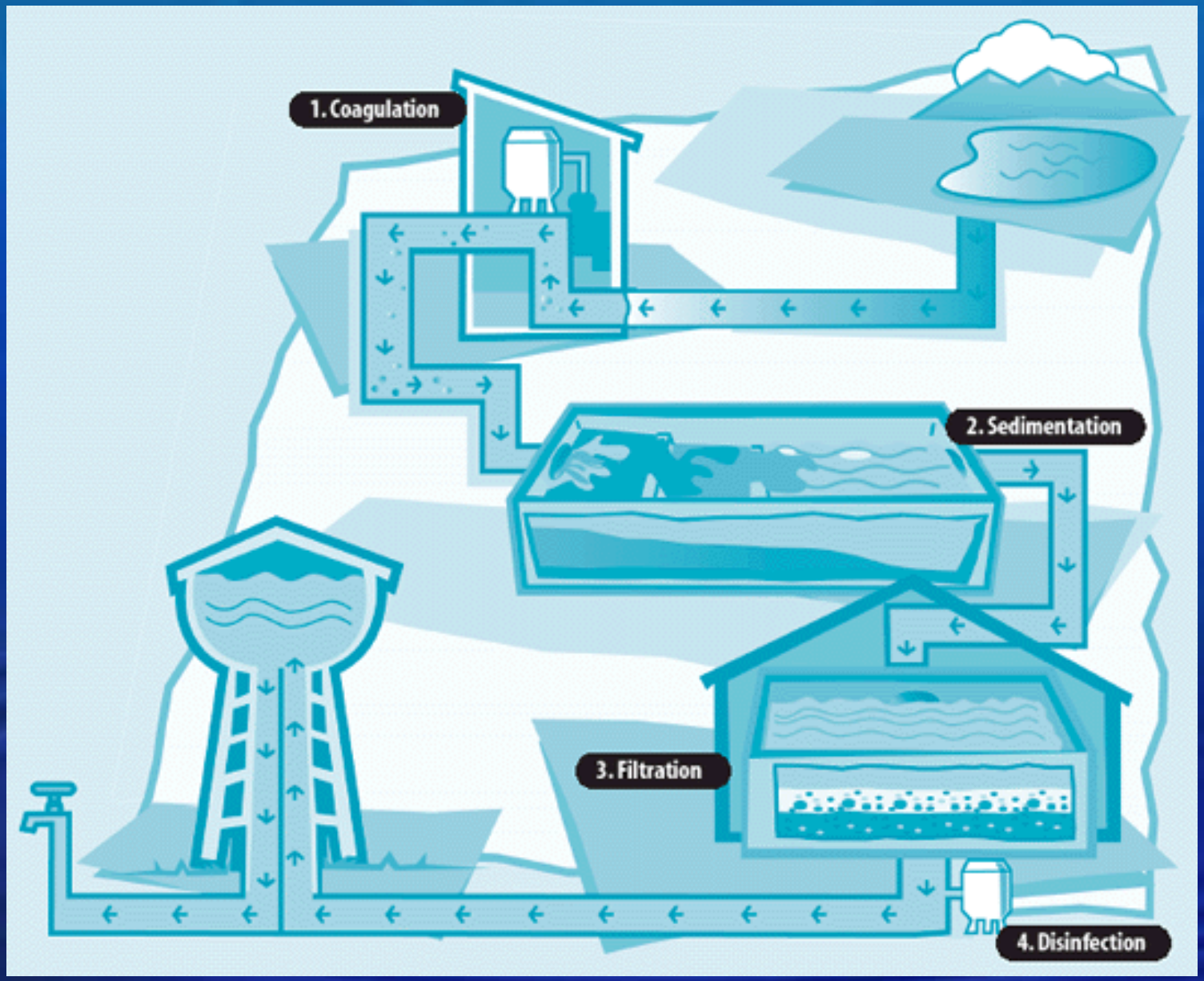
Impacts of water pollution

- Pollution of water sources makes water non-potable (undrinkable)
  - Needs to be treated, this is expensive
- Impacts on coastal areas and wildlife
  - Coral reefs
  - Fish and other marine life
- Impact on agriculture
  - Irrigation water is very important
- Impact on recreational activities

Water pollutants

- Microorganisms (germs) can live in the water
  - From animals and humans
  - Causes diarrhoea and other diseases
- Particles (dirt)
  - Soil from land and roads
- Chemicals
  - From fertilizers, pesticides and herbicides
  - Oil and grit from roads

Water Treatment Process



Water treatment processes

- Water is treated to remove particles, bacteria and contaminants via:
  - Sedimentation: Let the particles settle out of the water
  - Filtration: Sand filters work to remove any leftover particles
  - Disinfection: Kills microorganisms by adding chlorine
  - 1 MGD are treated at the La Guerite Treatment Plant

La Guerite Treatment Plant

La Guerite Treatment Plant

Chlorinator at wellhead

Chlorinator at wellhead

Thank you!
Questions?