



SEACHEM **FILTRATION**

let's get something **clear** . . .  
your **water** for starters



# Filtration

- Good Filtration
  - What Qualities are needed?
    - Maximum surface area, high capacity, efficiency, minimal impact on supplementation and elements, removes impurities (or unwanted material)

# Three Stages of Filtration

## Mechanical Filtration

- Traps larger debris or solids - clean properly and frequently to avoid break down of materials
- First method of filtration and important
- When kept clean, will ensure chemical and biological filtration can work more efficiently
- Filter Floss, filter pads, etc.

# Three Stages of Filtration

## Chemical Filtration

- Removes dissolved waste, smaller particles, and ions
- Filters water before reaching biological filtration
- Includes carbons, phosphate adsorbers, resins

# Three Stages of Filtration

## Biological Filtration

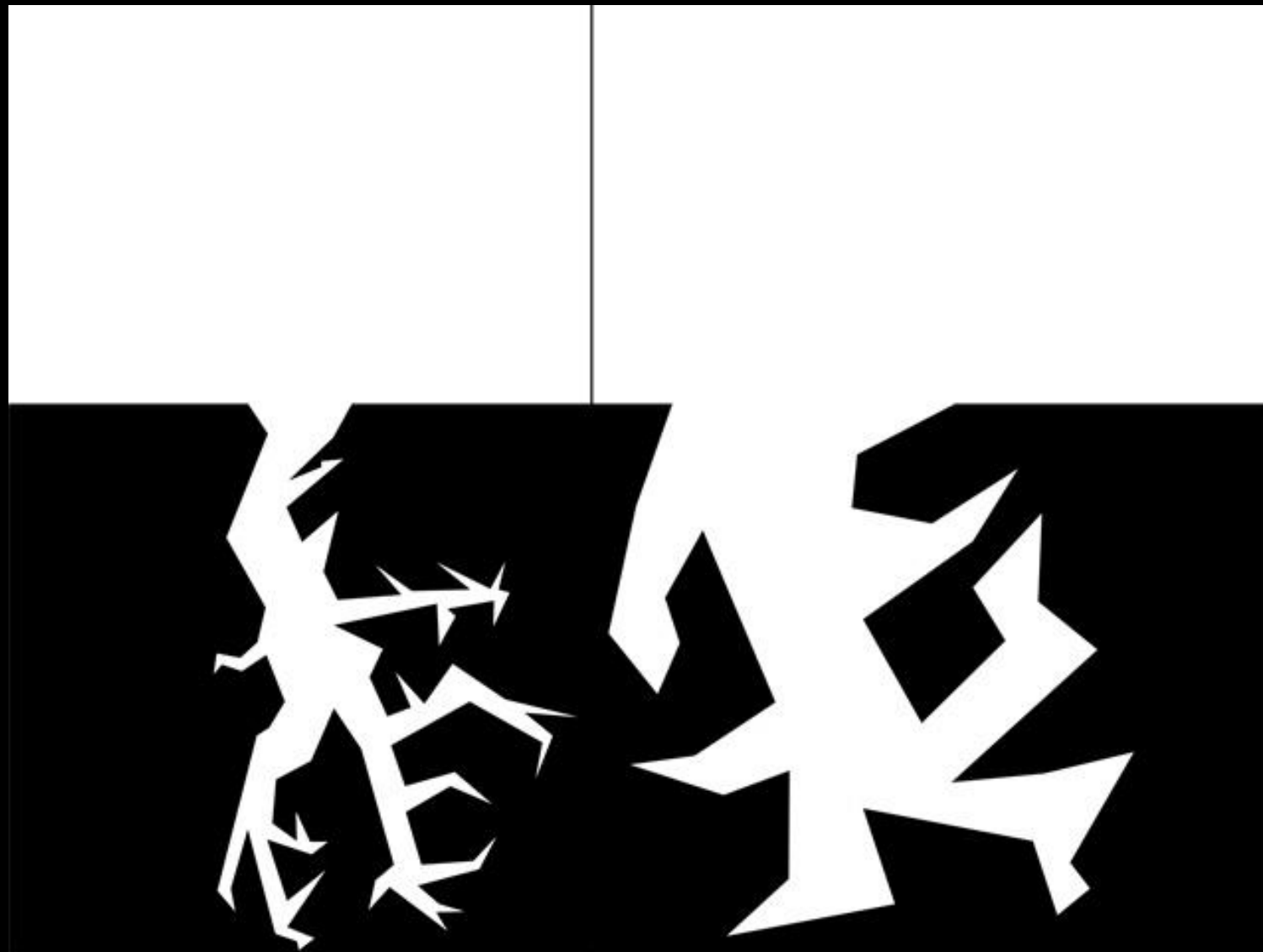
- Supports large number of diverse bacteria
  - high surface area; surface with ability for bacteria to attach
  - aerobic and anaerobic bacteria
- Ultimately controls ammonia, nitrite, nitrate
- Very important for long term health of fish

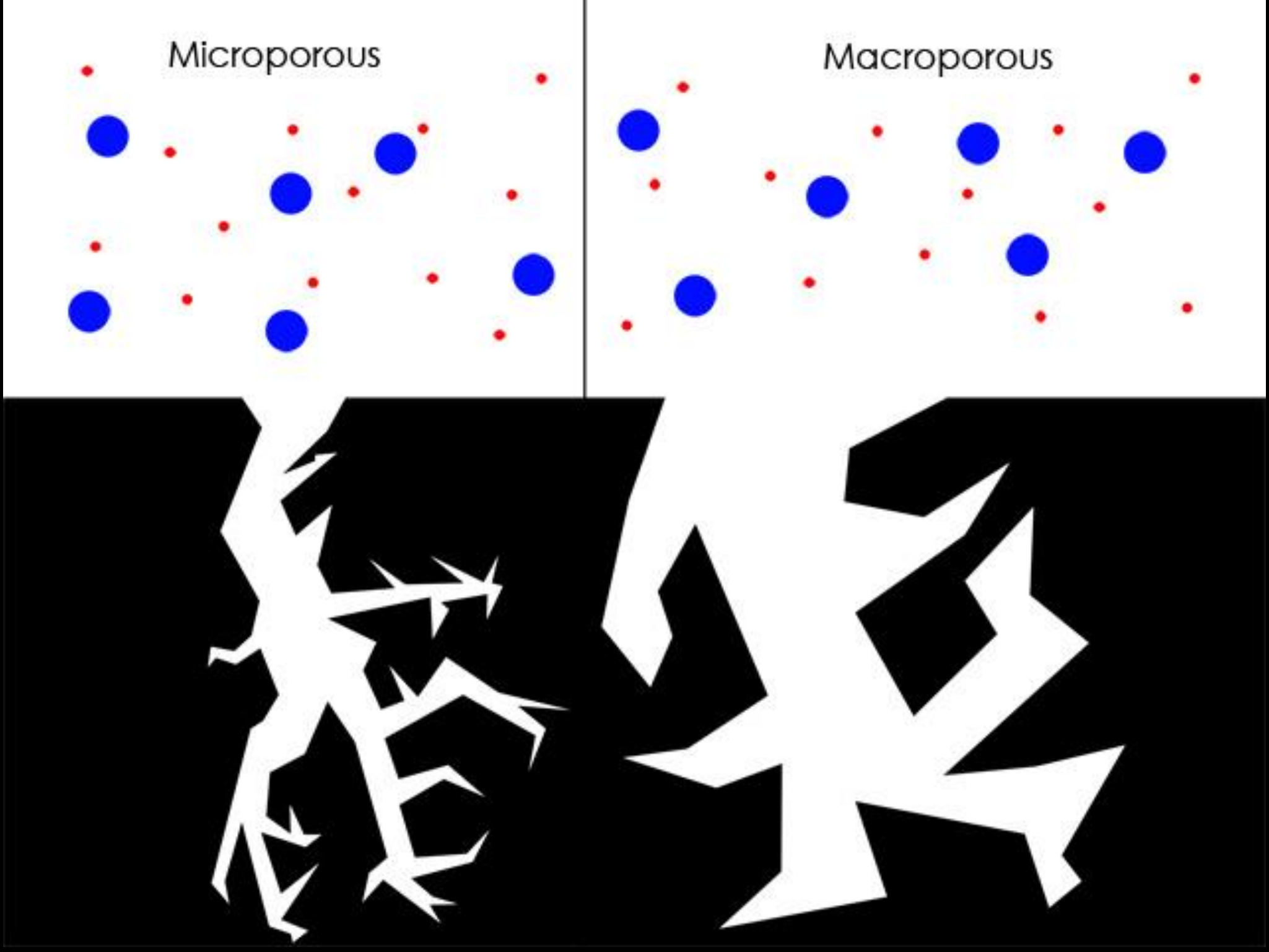
# Chemical: Activated Carbons

- Activated Carbon acts as molecular sieve; traps dissolved organics
- Made from heating natural material at very high temperatures [wood, coal, bone, coconut (only practical for air purification)]
- Macro-porous vs. Micro-porous
- Bituminous Coal
- What is ideal / what to look for in an activated carbon?
  - low iodine #, low ash content, high molasses #, high surface area, high capacity, dull surface/not shiny, shape for hydrodynamics, fizzes when wet, low impact on pH



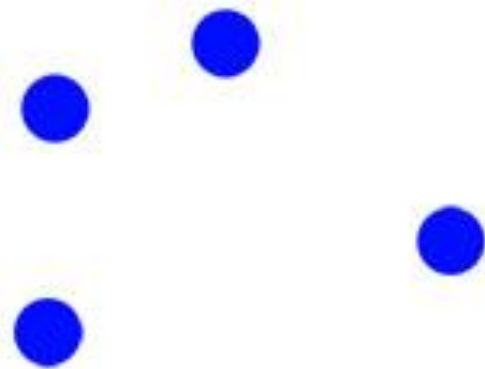
# Microporous vs. Macroporous





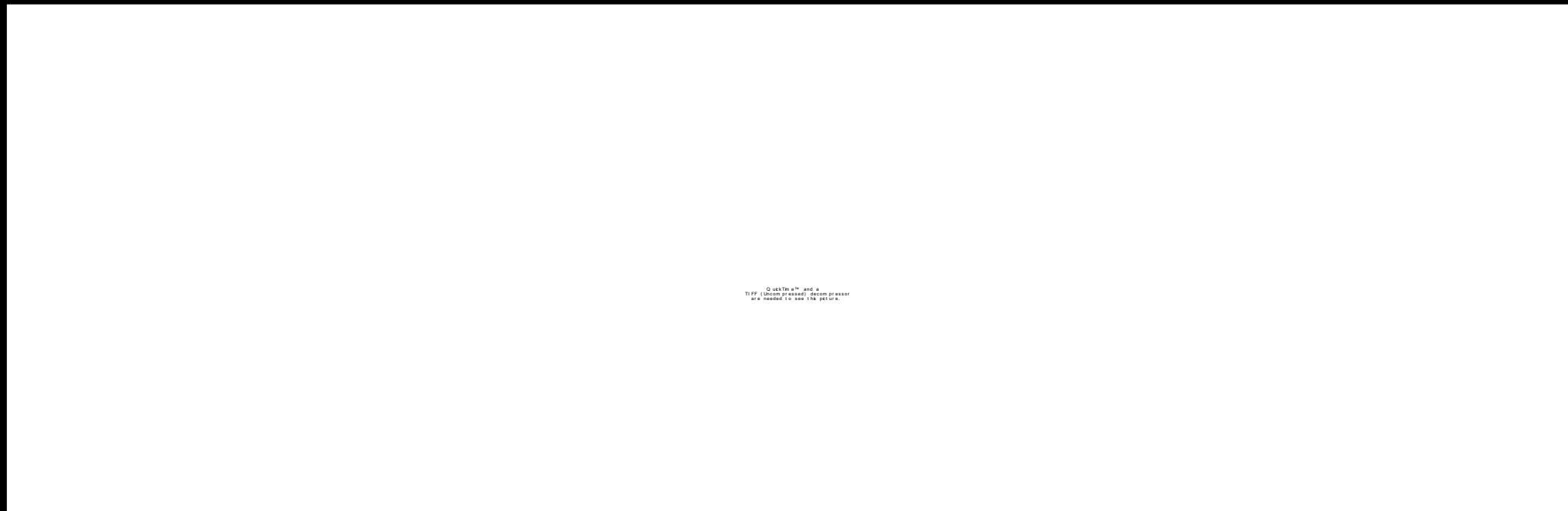


Microporous



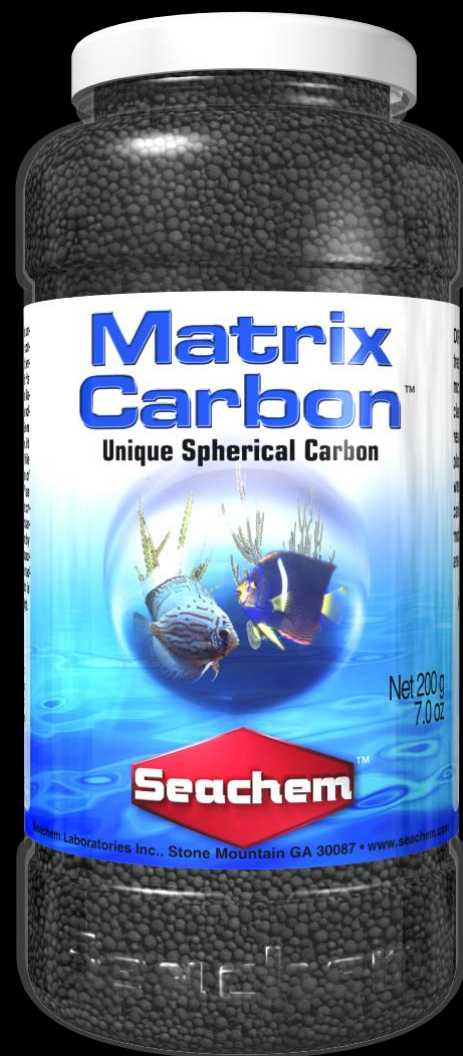
Macroporous





**Hydrodynamics:  
note how shape impacts flow**

# Matrix Carbon



- Spherical - better hydrodynamics (water flow)
- Very little impact on pH due to low ash content
- Lowest leachable phosphate level on market
- High removal capacity; large surface area
- Minimal impact on trace elements
- Works well in fresh water & salt water systems

# Matrix Carbon

## Specifications:

Shape:	Spherical
Mean Diameter:	2.39 mm
Density:	0.49 g/cc
Pore Volume (PV):	0.55-0.65 mL/cc
Total Surface Area (TSA):	500-600 m <sup>2</sup> /cc
TSA/PV:	770-1100 m <sup>2</sup> /mL
Iodine #:	>1000
Molasses #:	>600
pH in distilled water:	<7.2
Leachable Phosphate:	<0.00001 g/cc

# Renew

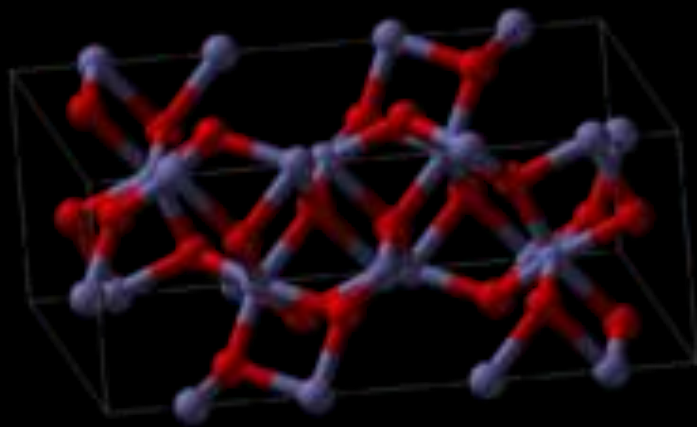


- Phosphate-free carbon substitute
- High pore # for maximum organic removal
- Can support bacteria to help control ammonia/nitrite/nitrate
- Ideal to use in planted tank or marine tank - does not leach phosphate
- Less aggressive than carbon - no impact on trace minerals and important nutrients
- Very economical



# Phosphate Adsorbers

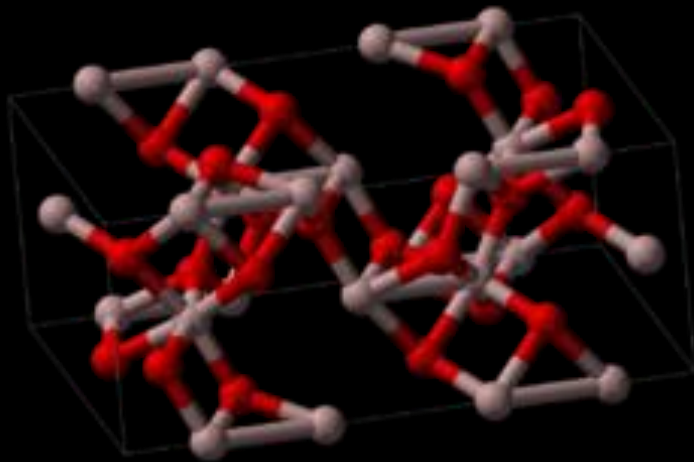
- Iron Oxide
  - insoluble
  - works well at high pH & in salt water\*\*\*
  - Lower pH? Freshwater?
  - not regenerable; irreversibly bound
  - removes phosphate, acids, silicate, arsenic, fluoride

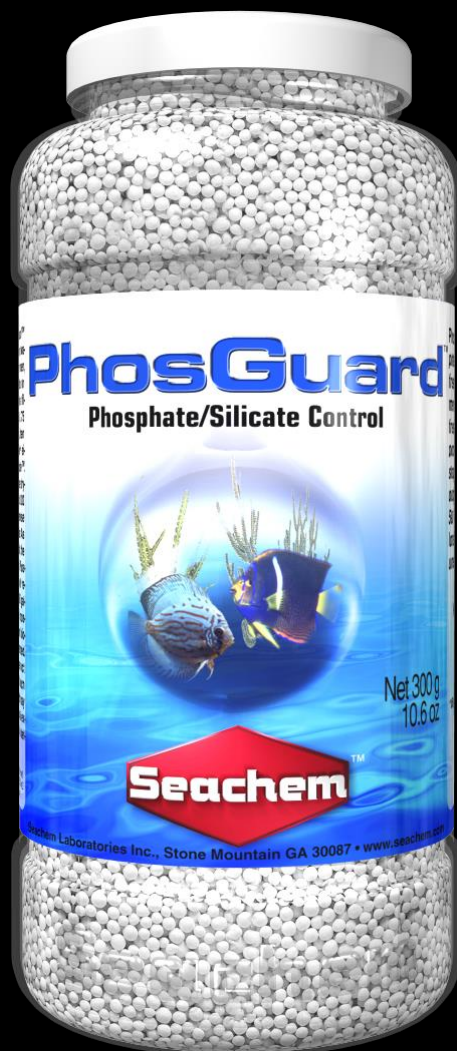




# Phosphate Adsorbers

- Aluminum Oxide
  - functions well at low pH *and* high pH
  - highly insoluble
  - good phosphate/silicate adsorber & absorber
  - removes arsenic, fluoride, acids
  - not regenerable; irreversibly bound
  - aluminum oxide study





# PhosGuard

- Spherical - better hydrodynamics (water flow)
- Removes silicate and phosphate
- Irreversible binding
- Porous nature allows maximum removal capacity
- Especially good algae control
- Good for marine and freshwater (careful of phosphate-based buffer systems)
- Each 500 mL of PhosGuard treats over 600 L (150 gallons\*) [i.e. will remove up to 30 mg/L of phosphate in 600 L (100 gallons\*) of water]



# SeaGel

- 50/50 Blend of Matrix Carbon and PhosGuard
- More convenient than two separate bags of media
- Removes phosphate, silicate, organics, metals, acids, and more
- Good when aggressive filtration is needed and for phosphate removal and/or prevention

# Synthetic Resins

- Selective means of filtration
- Ion Exchange Resins
  - replace one ion with another
- Scavenging Resins (i.e. organic waste/nitrogenous waste)
  - remove ions without replacing them with anything
- Better resins are light colored b/c of low cross linkage (more cross linkage = darker color)
  - lower cross linkage = better filtration of water

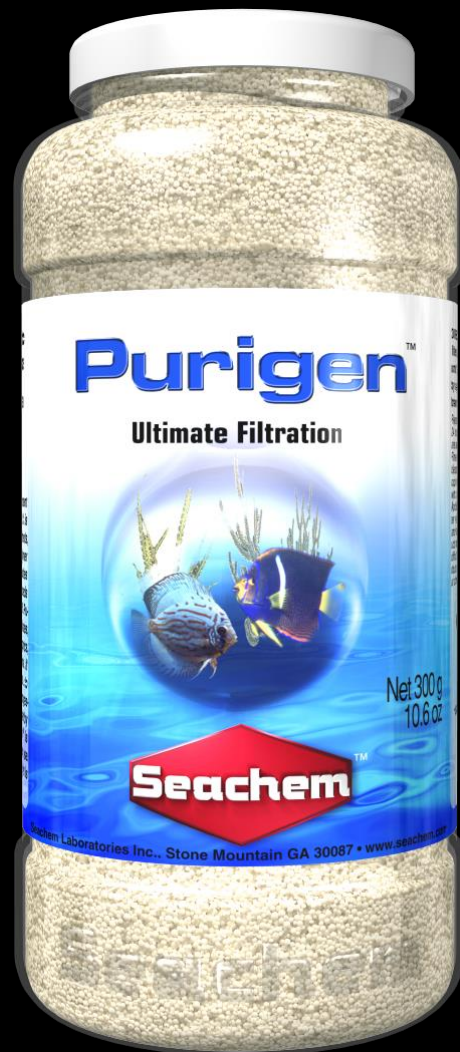




# HyperSorb

- High organic removal capacity
- Color changes as it exhausts
- Useful in any type of system
- Easily regenerated - household bleach
- Economical carbon substitute
- No impact on pH; minimal impact on trace elements

# Purigen



- Premium Synthetic Resin (polymeric)
- Macroporous
- Highest organic removal capacity
- No impact on pH or supplements
- Helps control ammonia/nitrite/nitrate
- Increases redox
- Saltwater & freshwater use
- Color changes as it exhausts; easily regenerated





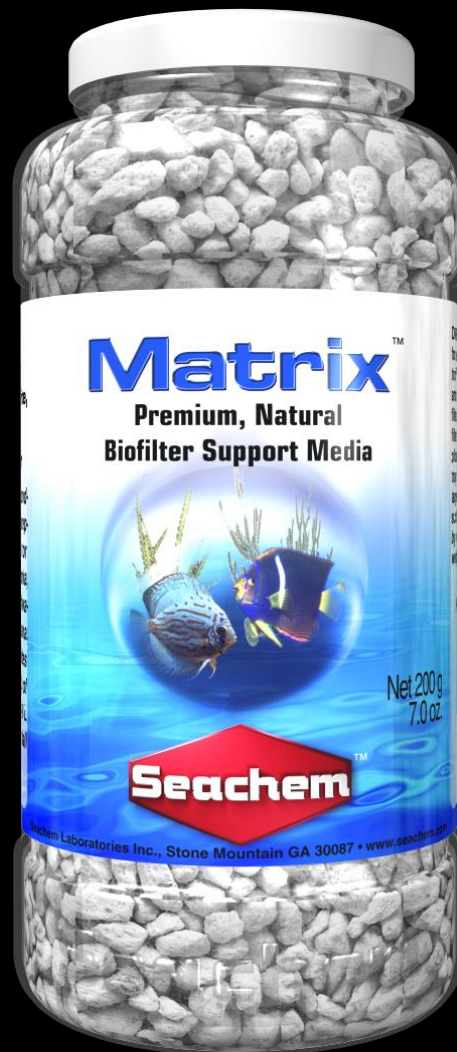
# CupriSorb

- Copper specific chelating resin
- Removes copper and heavy metals
- Saltwater and freshwater
- Removes all types of copper
- Color changes (to blue) when exhausted and can be regenerated

# Biological Filtration

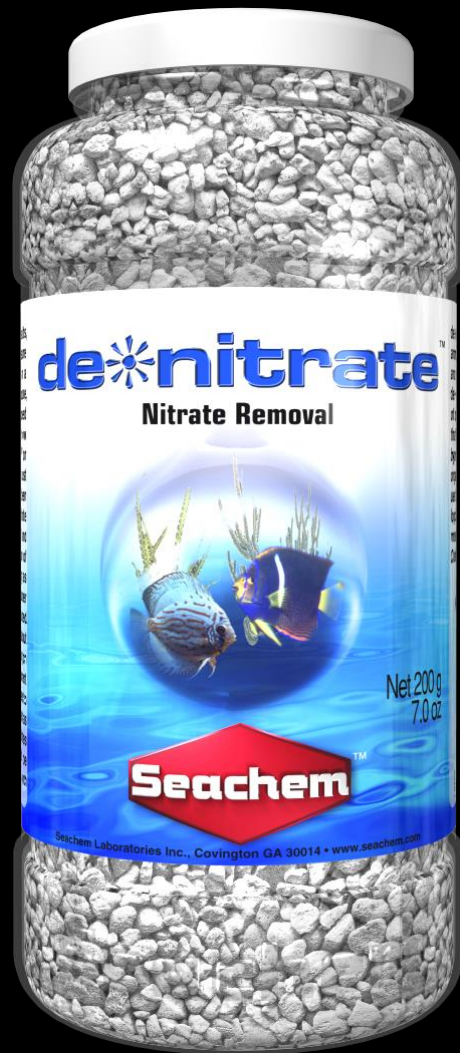
- Bio-Balls and most plastic media
  - smooth surface
  - well-suited for aerobic bacteria
- Zeolite
  - removes ammonia- not as efficient at controlling nitrite and nitrate
  - does not perform well in salt water
- Sponges
  - large pores, less surface area, clogs easily, loss of beneficial bacteria when cleaned

# Matrix



- Controls ammonia, nitrite, *and* nitrate
- Highly porous - enormous surface area (160,000 cm<sup>2</sup>)
- Will support large # of bacteria (contains 40 times the surface area of Bio-Balls)
- Supports diverse bacteria population
  - Internal pore structure well suited for anaerobic bacteria
  - External pores support aerobic bacteria
- Works well in filtration for marine and freshwater - removes nitrate at any flow
- Very economical - 1L treats 100 gallons

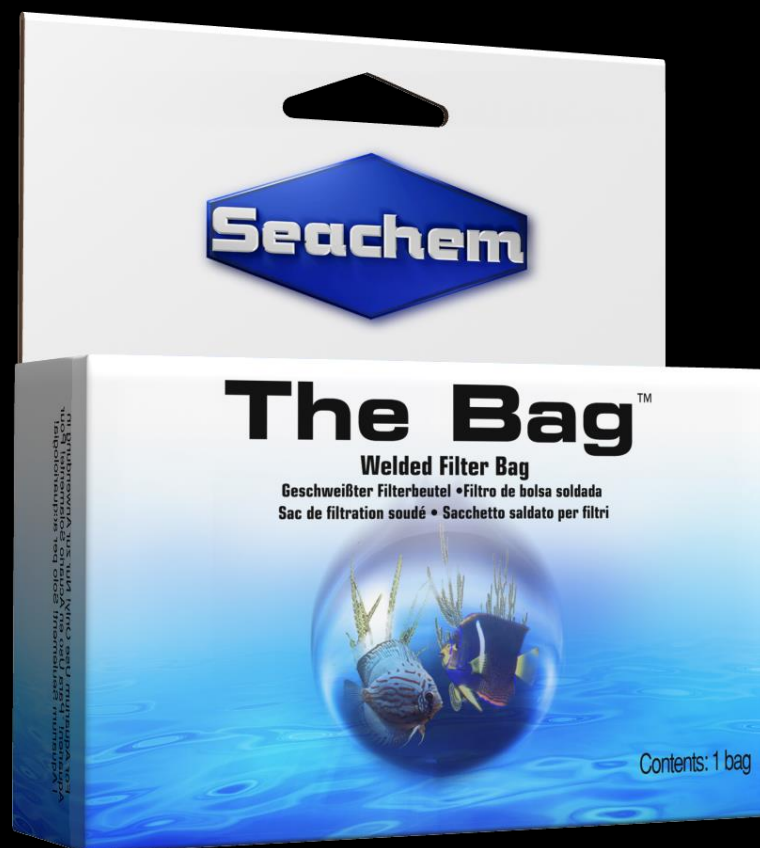
# de\*nitrate



- High porosity biological media
- Smaller grain size than Matrix to restrict water flow
- Pore size well suited for anaerobic bacteria - controls nitrates
- Best used with good flow through it at 50 gph
- Works well to lower nitrates with low flow
- No need for alcohol feeding
- No danger of hydrogen sulfide production as with sulfur based media



# The Bag



- Polyethylene - holds up well during HyperSorb and Purigen regeneration
- Heat welded
- 180 micron mesh
- Unbeatable lifespan
- Holds all Seachem filtration medias and works well with others

# Reverse Osmosis

- Reverse Osmosis uses a membrane to act like an extremely fine filter to create viable water from unfiltered water (or otherwise contaminated) water. The source water goes through a series of cartridge filters on one side of the membrane and pressure is applied to stop, and then reverse, the osmotic process. Two factors most important to creating good product water are pressure and temperature. The higher the pressure the better (40-60 PSI is ideal). The colder the water, the better. Lowers TDS, removes bacteria, organics, dyes, etc.





# Pinnacle and Pinnacle + Units

- Pinnacle and Pinnacle + Units
  - offered in 35, 50, 100, and 200 gpd units
- High impact John Guest fittings
- Automatic shut off valve
- External Flow Restrictors
- 3 stage and 4 stage (includes DI)
- Pressure Gauge
- Water can be used for any system - ultra pure base level for any system

