Inorganic polymers
Phosphates

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PHOSPHATE

- Phosphate formation arise from a combination of this Phosphorus and Oxygen
- i.e. P + 4O → PO_4^{-3} All living organism contain phosphorus. Phosphorus is an important element of live as a component for cell membranes, as an energy source, and for other bio-chemical processes.

- It is the backbone of Adenosine Tri-phosphate, or ATP, which is the very basic source of energy for all cellular work and a Chief component DNA our Identity

Phosphates exist in Three (3) forms

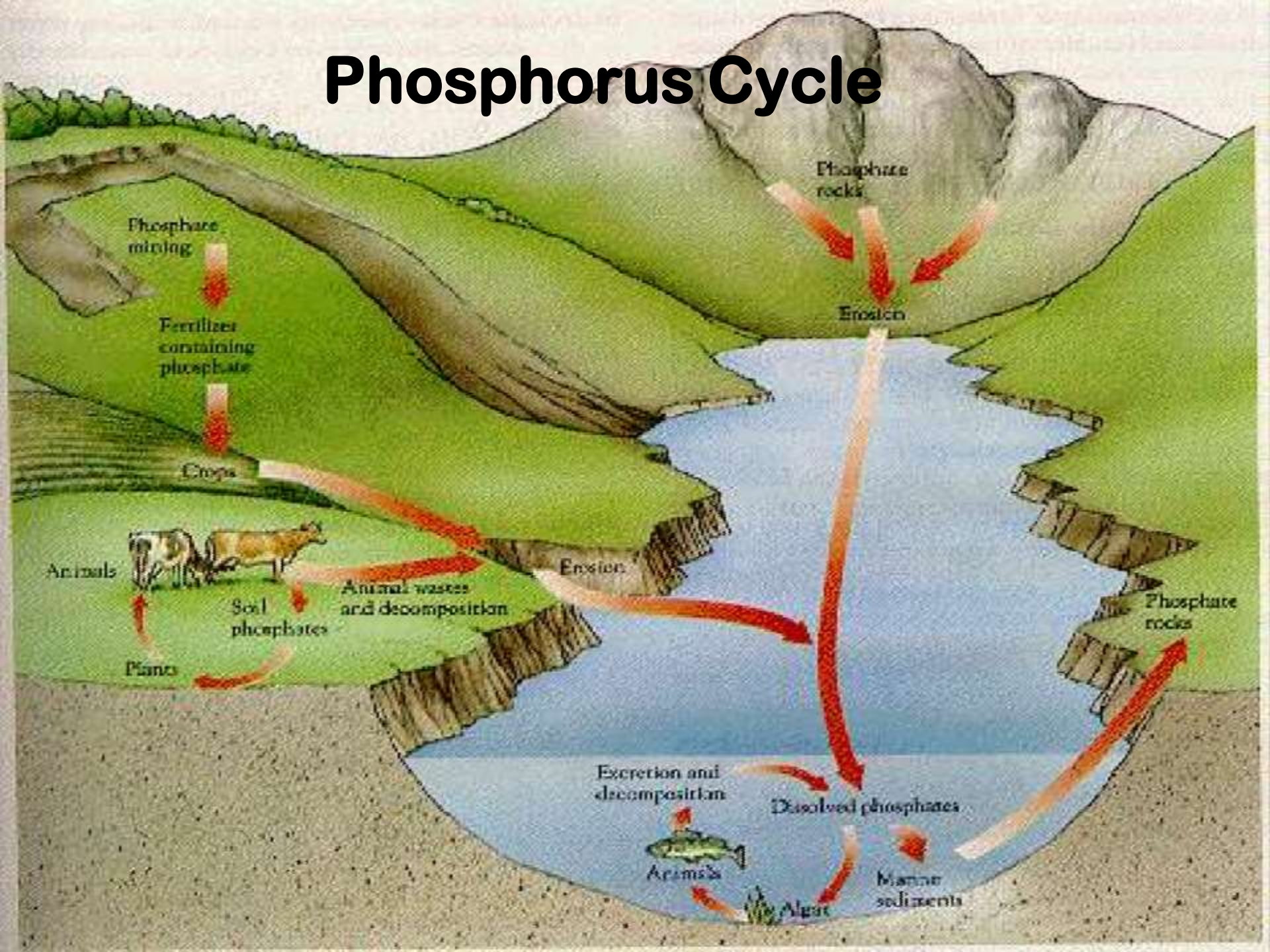
~~Orthophosphate~~

- Orthophosphate
- Metaphosphate (Polyphosphate)
- Organically Bound Phosphate

Sources Of Phosphate In Water

- Cultural Practices in agriculture (Fertilizers, Pesticides application)
- Natural sources (Weathering of rocks containing phosphorus
- Decay of residual feed substances fed to fish
- Dead fish, fecal matter of fish, dying algae.

Phosphorus Cycle



Test for Phosphate

- To test for the presence of phosphate you will use the cube kit that measures the most common form, orthophosphate or the color disk that determines orthophosphate and polyphosphate. A total phosphate kit measures all the three types.
- When test result shows levels of 1.0 ppm the condition become favorable for algae growth to start, at 2-3 ppm algae overgrowth rate is likely to occur.
- Ideal phosphate levels are 0.05 ppm or less.

Phosphate levels and its effects

Total Phosphate	Effects
0.025 - 0.1 mg/L	level at which plant growth is stimulated
0.1 mg/L -	maximum acceptable to avoid accelerated eutrophication
> 0.1 mg/L	accelerated growth and consequent problems

Effects of Phosphate On Aquatic Life

Phosphate stimulate the growth of phytoplankton and aquatic plants which provide food for larger organisms, including: zooplankton, fish, and other living aquatic organisms.

Plankton represent the base of the food chain. Initially this increased productivity will cause an increase in the fish population and overall biological diversity of the system.

Eutrophication (from the Greek - meaning "well nourished") is enhanced production of primary producers . This reduce stability of the ecosystem.

Relationship between phosphate and other water parameters.

- Increasing Phosphate reduces dissolve Oxygen content.
- Rate of increase of Phosphate is directly proportional to turbidity.
- Increasing amount of phosphates reduces pH making water more acidic.
- Rate of increase in Phosphate is directly proportional to ammonia

PHOSPHATES ($PO4^{-3}$) cont.

How to Regulate Phosphate Levels in Ponds

- Addition of Alkaline earth metal (Be, Mg, Ca) to Precipitate the phosphate i.e.

$$10\ Ca^{2+} + 6\ PO_4^{3-} + 2\ OH \leftrightarrow Ca_{10}(PO_4)*6(OH)_2$$

- Repetitive water changes
- Addition of Chemicals e.g. Phosguard, Phos-zorb, etc.
- The use of Poly – filter pads
- Tank cleaning