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WORKSHEET 25

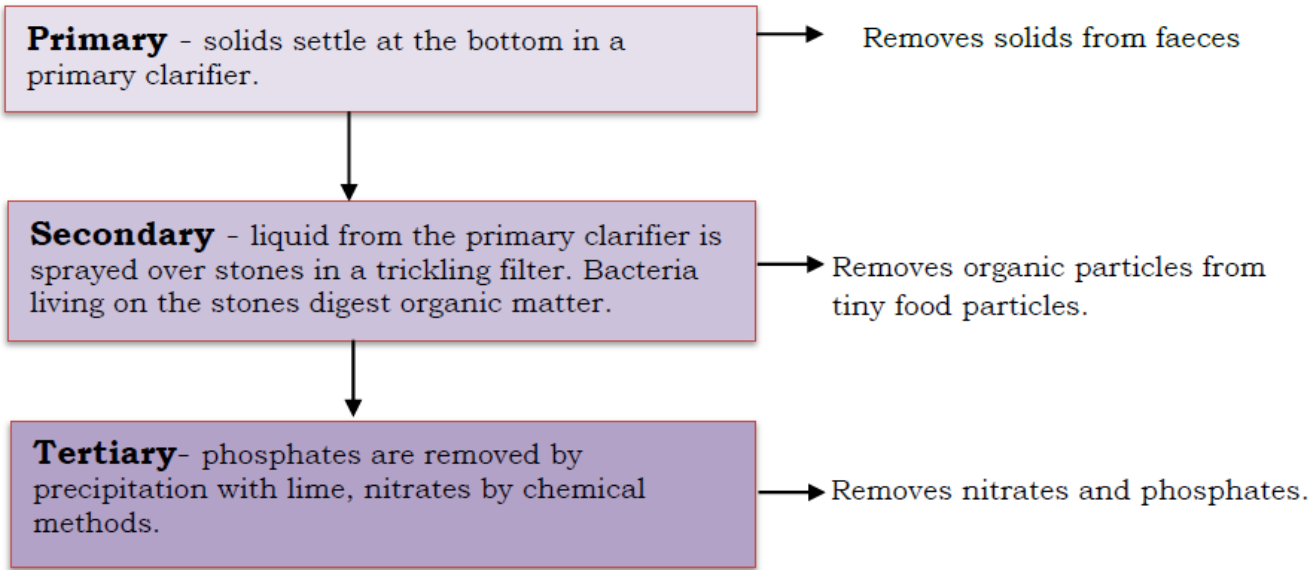
School: Ba Sangam College **Year:** 11
Subject: Chemistry **Name:**

Strand	**5 – Environmental Chemistry**
Sub strand	**5.2 -Water and Water Pollution**
Content Learning Outcome	**-Describe the stages of water treatment processes and its importance to human health.** **-Collect information and talk about some mineral water extraction in Fiji.** **-Study and describe stages of sewage treatment as applied locally.** **-Explore and discuss the effect of discharging raw sewage on the environment.**

Sewage Treatment

A sewage treatment plant like the one in Kinoya separates sewage into effluent and sludge.

Stages of sewage treatment



Note:
Effluent – is the liquid that is released from the sewage treatment plant.
Sludge – is the solid from the primary and secondary clarifier.

Water Treatment

Drinking water comes from rainwater, surface water and ground water. Water needs to be treated before it can be used for drinking.

There are three steps in the treatment of drinking water: Coagulation, filtration and chlorination.

Coagulation	Filtration	Chlorination
Aluminium sulphate ($Al_2(SO_4)_3$) helps coagulate dirt particles, copper sulphate ($CuSO_4$) prevents algal growth, sodium carbonate neutralises acidity and softens water.	Layers of sand and gravel remove floc.	Chlorine kills bacteria, fluoride reduces tooth decay and lime neutralizes acidity

Effect of Fluoride on Health

Fluoride is added to reduce tooth decay. However, excessive consumption of fluoride (above the required amount) may lead to increased likelihood of bone fractures in adults and may result in effects on bone leading to pain and tenderness.

Exercise

1. What does the primary sewage treatment remove?
   - A. Effluent
   - B. Organic particles
   - C. Phosphates and nitrates
   - D. Solids from faeces

2. In sewage treatment, what does *effluent* refer to?
   - A. The liquid that comes into the plant.
   - B. The liquid that is released from the plant.
   - C. The solid particles that comes into the plant.
   - D. The solids that settle at the bottom of the clarifiers.

3. The steps in treating drinking water is
   - A. chlorination, filtration, coagulation.
   - B. chlorination, coagulation, filtration.
   - C. filtration, chlorination, coagulation.
   - D. coagulation, filtration, chlorination.

4. How are nitrates and phosphates removed during sewage treatment?

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5. Why are aluminium sulphate and chlorine added during water treatment?

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6. What material(s) is used for filtering the water during water treatment?

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7. Which of the following is removed in the primary sewage treatment process?
   - A. Effluent
   - B. Organic particles
   - C. Nitrates and phosphates
   - D. Faeces and vegetable peelings

8. The purpose of adding fluoride during water treatment is to
   - A. prevent tooth decay.

B. prevent algae growth.
C. help coagulate dirt particles.
D. neutralise acidity and soften water.

9. Recently, a broken sewerage pipe led to untreated sewage spill in some rivers in Suva. These spills can lead to a reduction in dissolved oxygen in the water, which will most likely lead to

A. a decrease in water temperature.
B. an increase in all fish populations.
C. an increase in the depth of the water.
D. a decrease in most aquatic animal populations.