LESSON 8 – ASSIGNMENT

1. Explain the role of water in the body for 5 different physiological processes.
   • Fluid intake and fluid excretion: There is usually a balance between intake and excretion of water. If the water balance becomes disturbed, this can seriously impede various bodily functions such as blood pressure, blood sugar levels or brain function. If there is an imbalance in the water balance we become thirsty. By the time we perceive this, our body is already short of water.
   • Water as a means of transport: Most of the water, which a person takes in each day, is required to transport nutrients into the cells. To be able to bind and remove metabolic waste products it is important that the water is not saturated with minerals.
   • Water for excretion, cleansing and detoxification: Water ensures that harmful catabolic products are washed from our bodies and detoxification processes can run more smoothly. In the cells it has a purifying action and is responsible for eliminating waste products and other residue.
   • Water as solvent: In our bodies water acts as a solvent for our food so that this can be transported and processed. It also serves to dilute a number of harmful substances.
   • Thermal regulation – the skin as air conditioning: An additional important role of water is to regulate body temperature. Alongside other regulatory mechanisms, sweating also helps maintain body temperature constant at around 37°C, regardless how cold or warm it is outside the body. Regulation of the acid-base balance: Chemical processes are continually taking place in the body. Metabolism, muscular action, nerve transmission processes – these would all be impossible without these chemical processes. Acids and alkaline substances must be balanced. If this is not the case, this leads to an adverse metabolic condition for the body.

2. List 5 factors, which affect the body’s requirement for water.
   Unlike many of the nutrients, there isn’t a specific daily recommendation for water intake. Part of the reason is the variability in individuals related to:
   • The climate in which they live,
   • Physical activity,
   • Age,
   • State of health,
   • Body size.
   Under typical circumstances, adults may replenish up to six or eight cups of fluid each day. Typical water output is two quarts or more of water each day. Water losses in urine account for about three-fourths of daily losses. Remaining losses come from sweat, as tiny water droplets in the air we exhale, and through feces. Infrequent urination or dark yellow urine may indicate you could use more fluid intake each day.

3. Compare 3 different methods of purifying water, including two commercially available water purifiers. Consider how each method differs, and the advantages and disadvantages of each. Which one would you select to purify tap water in your house? Why?

<table>
<thead>
<tr>
<th>Types of water purifiers</th>
<th>Carbon Filter using Activated Carbon from a process called paralysis*1</th>
<th>Water Distiller: heats water to create steam, when it cools, or condenses, the result is purified water where any impurities are left to linger in the remaining hot water.</th>
<th>Ultra Violet use high frequency light to irradiate water through a glass element. Water passing the element is exposed to the light.</th>
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</thead>
<tbody>
<tr>
<td>Remove heavy metals (copper/lead)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Remove harmful living organisms</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Remove alkaline minerals (Ca,Mg,K and Na)*2</td>
<td>No</td>
<td>Essentially mineral-free, carbon dioxide from the air is rapidly absorbed, making the water acidic.</td>
<td>No</td>
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<td>Remove harmful chemical additives*3</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Replacement need</td>
<td>Yes (Carbon, water and trapped particles, left together in a sealed, low oxygen, environment, can allow anaerobic microbes to reproduce, especially when the filter is left unused for a couple of weeks.)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Recycled</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Power need to work (so no use in emergency cases)</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
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</table>
Paralysis: is a form of incineration that chemically decomposes organic materials by heat in the absence of oxygen.

Calcium, Magnesium, Potassium and Sodium - very important minerals!

Free Chlorine (disinfectant and sanitizer), Iron Oxides (rust, pigments in paints, coloured concrete) and Hydrogen Sulphides (extremely hazardous, toxic compound).

For people like us that live in cities we use Tap Water – Easy, quick, and convenient. But how many pollutants lurk in your water? And what is your associated health risk? Distilled Water must to be used with caution; long-term use can invite health problems, because its minerals are evaporated out. So to try to maintain mineral balance, it sucks minerals out of your body. What's worse, the contaminants in the water are more concentrated in the finished distilled water. You can just imagine what that does to our health. I think the best alternative is combining methods: we always have an Activated Carbon Filter at home and filtered tap water but I found that Kinetic Degradation Fluxion (KDF) is also known as redox media. It utilizes an all-natural process in which the "dissimilar" metals copper and zinc are used to create a kinetic charge from the flow of the water through them that kills microorganisms and alters or removes many problem contaminants. It also conditions water with a "softening" effect but can be a bit expensive.

4. Describe the symptoms of mild, severe and chronic dehydration, and how a lack of water might cause these symptoms to occur.

Mild dehydration symptoms are:
- Increased or constant vomiting for more than a day
- Fever over 38.3°C, but less than 39.4°C
- Diarrhea for more than 2 days
- Weight loss
- Decreased urine production
- Weakness
- Dry mouth
- Thirst

Athletes, elderly, people who don’t drink enough (especially in hot weather) can all suffer from mild dehydration.

Take the person to the hospital's emergency department if these situations occur because there are the symptoms of a severe dehydration:
- Fever higher than 39.4°C
- Confusion
- Lethargy
- Headache
- Seizures
- Difficulty breathing
- Chest or abdominal pain
- Fainting
- No urine in the last 12 hours

And the chronic dehydration symptoms are:
- Fatigue, Energy Loss: Dehydration of the tissues causes enzymatic activity to slow down.
- Constipation: the colon takes too much water to give to other parts of the body.
- Digestive Disorders: the secretions of digestive juices are less.
- High and Low Blood Pressure: The body’s blood volume is not enough to completely fill the entire set of arteries, veins, and capillaries.
- Gastritis, Stomach Ulcers: To protect its mucous membranes from being destroyed by the acidic digestive fluid it produces, the stomach secretes a layer of mucus.
- Respiratory Troubles: The mucous membranes of the respiratory region are slightly moist to protect the respiratory tract from substances that might be present in inhaled air.
- Acid-Alkaline Imbalance: Dehydration activates an enzymatic slowdown producing acidification.
- Excess Weight and Obesity: We may overeat because we crave foods rich in water. Thirst is often confused with hunger.
- Eczema: Your body needs enough moisture to sweat 20 to 24 ounces of water, the amount necessary to dilute toxins so they do not irritate the skin.
- Cholesterol: When dehydration causes too much liquid to be removed from inside the cells, the body tries to stop this loss by producing more cholesterol.
- Cystitis, Urinary Infections: If toxins contained in urine are insufficiently diluted, they attack the urinary mucous membranes.
- Rheumatism: Dehydration abnormally increases the concentration of toxins in the blood and cellular fluids, and the pains increase in proportion to the concentration of the toxins.
- Premature Aging: The body of a newborn child is composed of 80 percent liquid, but this percentage declines to no more than 70 percent in an adult and continues to decline with age. A lot of the chronic dehydration list is a “consequence”, not necessarily a symptom e.g. Premature aging, cholesterol.

5. Discuss the effect of 5 different water impurities on human health.
- Protozoal Infections: Amoebiasis, Cryptosporidiosis, Microsporidiosis, Cyclosporiasis, Giardiasis and general symptoms are Abdominal discomfort, fatigue, weight loss, bloating, fever, flu-like symptoms,
watery diarrhoea, loss of appetite, nausea, vomiting, muscle aches.

- Parasites Infections: Schistosomiasis, Dracunculiasis, Taeniasis, Fasciolopsiasis, Onchocerciasis, Echinococcosis, coenurosis, Ascariasis, Enterobiasis symptoms can vary from Rash or itchy skin, swollen lymph nodes, fever, chills, cough and muscle aches to allergic reactions, vomiting, diarrhoea, asthmatic attack.

- Bacterial Infections: Botulism, Campylobacteriosis, Cholera, E. coli Infection, M. marinum infection, Dysentery, Legionellosis, Leptospirosis Otitis Externa, Salmonellosis, Typhoid fever, Vibrio Illness and symptoms can be from fever, flu like symptoms to more severe others.

- Viral Infections: Adenovirus infection, Gastroenteritis, SARS, Hepatitis A, Poliomyelitis, Polyomavirus infection and symptoms include common cold symptoms, pneumonia, croup, and bronchitis, diarrhea, nausea, vomiting, fever, malaise, abdominal pain, lethargy, gastrointestinal symptoms, cough, sore throat.

- Contaminants in water are more likely to cause chronic health effects - effects that occur long after repeated exposure to small amounts of a chemical. Examples of chronic health effects include cancer, liver and kidney damage, disorders of the nervous system, damage to the immune system, and birth defects. Contaminants can be: Organics (potentially toxic chemicals and metals as pesticides, including herbicides, insecticides, and fungicides) and Volatile organic chemicals, Inorganics (toxic metals like arsenic, barium, chromium, lead, mercury, and silver from natural sources, industrial processes, and the materials used in your plumbing system) and radioactive elements (Radon is a radioactive contaminant that results from the decay of uranium in soils and rocks).