**DAV PUBLIC SCHOOL, PTPS PATRATU**

**CLASS: 7 SUBJECT: Chemistry(NOTES)**

**LESSON: 10 (Soil)**

**Soil:** It is the naturally occurring, loose covering of broken rock particles and decaying organic matter (humus) on the surface of the Earth which can support life.

**Weathering:** A combination of physical, chemical and biological process on rocks is called weathering. It leads to soil formation. Weathering can be of two types, physical and chemical weathering.

**Agents of Physical Weathering:**

1. Temperature: Rocks expand and contract due to changes in temperature and become weak. Gradually, the rocks break apart.
2. Water: Flowing water washes away the broken particles of rocks and deposits them somewhere else as sediment. Further, the flowing water also exposes the underlying rocks to different weathering agents.
3. Wind: Wind has abrasive effect on rocks, due to this rock particles are swept away by wind and deposited elsewhere.
4. Plants and animals: Lichens and mosses grow on bare rocks and cause gradual disintegration of rocks. Grasses, shrubs and trees also break rocks because their roots enter the crevices in the rocks.

**Chemical Weathering:** Organic acids released during the decomposition of organic matter lead to weathering of rocks. Salts dissolve in water and the solution causes weathering.

**Soil Profile:** Arrangement of different layers of soil is called soil profile. Different layers of soil; at a particular place; are called soil horizons. Various soil horizons are as follows:

- O Horizon: This is the topmost layer of soil. It is mostly composed of leaf litter and humus.
- A Horizon: This is below the O horizon and is also known as topsoil. It is composed of humus and minerals.
- B Horizon: This is also called sub-soil. It is composed of clay and mineral deposits.
- C Horizon: This is composed of slightly broken up bedrock. Roots of plants do not penetrate this layer.
- R Horizon: This layer is at the bottom and is composed of unweathered rock.

**Properties of Soil:**

Soil Texture: The bigger and coarse particles are called sand. The smaller and smooth particles are termed clay. The intermediated particles which are neither very rough, nor too smooth are called silt. On the basis of texture, soil can be classified into three types

(a) Sandy Soil: This soil is composed of bigger particles. This soil is well aerated. This type of soil cannot retain water because water drains out quickly. Sandy soil is not fit for farming.

(b) Clayey Soil: This soil has a higher proportion of fine and smooth particles. This type of soil is not well aerated but can retain lot of water. This type of soil leads to problem of water logging in the fields.

(c) Loamy Soil: This soil is a mixture of sand, silt and clay particles. It can hold reasonable amount of water and air. This soil is best for farming.

**Soil Colour:** Soil colour differs due to mineral content of parent rock and amount of organic matter. Soil can be red, yellow, brown or black. Dark coloured soil often contains a good amount of humus. Red colour of soil is because of high proportion of iron in it.

**Soil Structure:** Soil particles have a tendency to stick together, if the soil contains a high proportion of clay. On the other hand, sandy soil does not stick together.

**Plasticity and Cohesion:** Because of plasticity, a particular type of soil can be given any shape. Sandy soil is non-plastic, while clayey soil is plastic in nature.

**Soil Density:** Soil with larger particles is denser than soil with smaller particles.

**Infiltration and Percolation Rate:** Absorption of water by the soil depends on infiltration and percolation rate. The rate at which water enters a soil is called infiltration rate. The rate at which water moves through soil is called percolation rate. A soil with a higher infiltration rate but moderate percolation rate is good for farming.

**Composition of soil:** Following components are generally found in soil:

***Inorganic substances:*** Most of the inorganic components of soil are derived from the parent rock.

***Organic Material:*** The organic matter mainly comes from dead and decaying parts of plants and animals. The high humus content means the soil would be highly fertile.

***Soil water:*** Soil water is usually present in the spaces between soil particles.

***Soil Air:*** Air is present in spaces between soil particles. Soil air is important for respiration by roots.

***Living Organisms:*** Many organisms are present in soil. For example; bacteria, fungi, algae, etc. Some insects and small creatures also live in soil.

**Soil Pollution:** Accumulation of toxic compounds, chemicals, salts, radioactive materials, or disease causing agents; which can have adverse effect on plant and animal health; is called soil pollution. Chemical pesticides, excessive use of fertilizers and contamination of surface water are major causes of soil pollution.

**Soil and Crops**: Different types of soil are suitable for different types of crops. Cereal crops; like wheat and legume grow well in clayey soil and loamy soil. Cotton grows in sandy loam or loamy soil.

**Soil Erosion:** The removal of topsoil by agents of weathering is called soil erosion. Human activities hasten the rate of soil erosion and aggravate the situation. Plants prevent soil erosion because they hold the topsoil in place with their roots.

**Prevention of Soil Erosion:** Soil erosion can be prevented by afforestation practices. Afforestation involves planting trees on bare lands and near by fields.

## WORKSHEET

***Fill in the blanks.***

a. Polythene bags & fertilizers pollute the soil.

b. C horizon is made up of small lumps of rocks with cracks & crevices.

c. Air Pocket in a soil helps plant roots to breathe.

d. Sandy soil has maximum percolation rate.

e. Clayey soil has maximum water holding capacity.

f. Silt soil is deposited by fast-flowing rivers.

g. Clayey soil have smallest soil particles.

h. Humus is mixed with clayey soil to improve its texture & fertility.

i. Use of pesticide should be minimized to reduce soil pollution.

j. Humus make soil fertile and provide nutrients to the plants.

k. Soil that has the greatest proportion of large coarse particles is called sandy soil.

l. The spaces between soil particle are known as pore space.

m. Horizon A is also called topsoil.

n. Below the horizon C is the layer of hard rocks.

o. Loamy soil is the best soil for plant growth.

p. Soil is made up of pebbles, sand, silt, clay and humus.

q. Breaking down of rocks by the action of wind, water and climate is called weathering

r. Clayey soil gets waterlogged easily.

s. Horizon A contains good amount of humus.

t. Paddy grows well in clayey soil.

***Question Answer:***

**Q: Explain the differences between clayey soil and sandy soil.**

**Answer:** Clayey soil has smaller particles, is heavy, and retains a lot of water. Sandy soil has larger particles, is light, and retains very little water (drains quickly).

**Q: How can soil pollution and soil erosion be prevented?**

**Answer:**
**Prevention of Soil Pollution:** Minimizing the use of chemical fertilizers and pesticides, treating industrial waste before dumping, and banning plastic and polythene bags.
**Prevention of Soil Erosion:** Afforestation (planting trees), stopping deforestation, preventing overgrazing by animals, and practicing terrace farming.

**Q. State the meaning of the term 'soil.**

**Answer:** Soil is the naturally occurring, loose covering of broken rock particles and decaying organic matter on the surface of the earth.

**Q. List the four main agents of physical weathering.**

**Answer:** Temperature, water, wind, and plants are the main agents of physical weathering.

**Q. Name the types of soil classified on the basis of soil texture.**

**Answer:** On the basis of soil texture, soil is classified into three categories: sandy soil, clayey soil and loamy soil.

**Q. Give the meaning of the term 'Cohesion.**

**Answer:** the tendency, of similar particles, to stick to one another.

**Q. List any three causes of soil pollution.**

Answer : Three causes of soil pollution are:

(1) use of chemical pesticides

(2) excessive use of fertilisers

(3) oil and fuel dumping

**Q. Classify, and explain, the categories of soil on the basis of 'texture of the soil.**

**Answer:** On the basis of soil texture, soil is classified into three categories- sandy soil, clayey soil and loamy soil.

(1) Sandy soils – Sandy soils have soil particles that are bigger in size; the large spaces between them are filled with air. They are, therefore, said to be well aerated. Such soils cannot retain water as water can drain out quickly through the

spaces between the sand particles. Sandy soil needs more frequent irrigation for successful crop growth.

(2) Clayey soils – Clayey soils have a higher proportion of fine and smooth soil particles. There is very little space between the soil particles. Such soils cannot retain air. However, clayey soils can retain more water than sandy soils. This high-water holding capacity can cause problems, like water-logging, in the fields.

(3) Loamy soil – Loamy soil is a mixture of sand, silt and clay particles. It can hold both air and water. Loamy soil has humus also. It is considered to be the best soil for growing most of the crops.

**Q. Differentiate between infilteration rate and percolation rate.**

**Answer:**

Infiltration rate – The rate at which water enters the soil is called infiltration rate.

Percolation rate – The rate at which water moves through soil is called percolation rate.

**Q. Write a short note on 'composition of soil.**

**Answer:** Composition of soil depends on the nature of parent rock and the quantity and type of organic materials present in it. The following components are generally found in a soil:

(1) Inorganic substances: Most of the inorganic substances, present in the soil, are derived from the parent rock.

(2) Organic material (Humus): Humus increases the productivity and water holding capacity of the soil.

(3) Soil water: It is generally present in the spaces between the soil particles. The water content of a soil has a significant effect on plant productivity.

(4) Soil air: Spaces, between the soil particles, contain air. Well aerated soils are associated with healthy roots that increase crop productivity. Soil air is important for the respiration of roots.

(5) Living organisms: A variety of organisms are found in soil. They include micro-organisms like bacteria, fungi and algae.

**Q. "The type of crop that may be grown in a particular field depends on the type of soil: Give three examples in support of this statement.**

**Answer:** Three examples which support this statement are as follows:

(1) Rice grows well in clayey soil.

(2) Wheat grows well in loamy soil.

(3) Cotton grows well in sandy loam or loamy soil.

**Q. What is soil erosion? How can it be avoided?**

**Answer:** The removal of top soil by agents, such as wind and water, is called soil erosion. Agriculture, deforestation, overgrazing and careless cultivation speed up erosion.

Soil erosion can be avoided by extensive afforestation, avoiding overgrazing and overuse of land.

**Q. How does the weathering of rocks take place?**

**Answer**: Weathering occurs through the **physical breakdown and chemical decomposition of rocks** caused by the continuous mechanical action of wind, flowing water, fluctuations in temperature, and changing climatic conditions.

**Q. Why is topsoil (A-horizon) considered the most fertile layer?**

**Answer**: It contains the highest concentration of **humus and decaying organic matter**, which provides essential nutrients to growing plant roots. It is also soft, porous, and holds moisture effectively.

**Q.List two distinct features of the B-horizon (Subsoil).**

**Answer**:
It contains a higher amount of soluble minerals and iron oxides but has **very little humus**.
It is **lighter in colour, harder, and more compact** compared to the topsoil.

**Q. Differentiate between sandy soil and clayey soil based on their water retention.**

**Answer**: Sandy soil has large particles with wide spaces, allowing water to drain quickly, resulting in **low water retention**. Clayey soil has tiny, tightly packed particles that trap water, resulting in **high water retention**.

***Multiple Choice Questions:***

**1. The process of breaking down of rocks into smaller particles by wind, water, and climate is called—**
(a) Erosion
(b) Weathering
(c) Percolation
(d) Deposition Ans:b

**2. Which soil horizon is rich in humus and minerals?**
(a) C-horizon
(b) B-horizon

(c) A-horizon (Topsoil)
(d) Bedrock Ans:c

**3. The soil that is best suited for growing crops like wheat, gram, and paddy is—**
(a) Sandy soil
(b) Clayey soil
(c) Loamy soil
(d) Gravel Ans:c

**4. The water-holding capacity is highest in—**
(a) Sandy soil
(b) Clayey soil
(c) Loamy soil
(d) All of these Ans:b

**5. The removal of land surface by wind, water, or ice is known as—**
(a) Weathering
(b) Soil erosion
(c) Soil pollution
(d) Waterlogging Ans:b

**6. Soil is composed of—**
(a) Rock particles and minerals
(b) Humus
(c) Air and water
(d) All of these Ans:d

**7. Which type of soil particles are the smallest in size?**
(a) Sand
(b) Silt
(c) Clay
(d) Gravel Ans:c

**8. The mixture of decayed organic matter and plant/animal remains in the soil is called—**
(a) Humus
(b) Gravel

(c) Silt
(d) Bedrock Ans:a

**9.Which one of the following is a step in the formation of soil?**
**(a) Earthquakes or volcanic eruptions**
**(b) Weathering of rocks**
**(c) Addition of humus**
**(d) All are involved in the formation of soil**

**Ans. (d)**

**10.In which horizon of soil minerals are found?**
**(a) A**
**(b) B**
**(c) C**
**(d) None of these**

**Ans. (b)**

**11.Which physical property of soil is important to us?**
**(a) Texture**
**(b) Water holding capacity**
**(c) Both of these**
**(d) None of these**

**Ans. (c)**

**12.The proportion of sand, silt and clay in a soil sample determines**
**(a) structure**
**(b) texture**
**(c) nutrient potential**
**(d) fertility level**

**Ans. (b)**

**13.Availability of water and minerals in the soil for maximum absorption by roots is in the:**

**(a) B-horizon**
**(b) C-horizon**
**(c) A-horizon**
**(d) Surface of soil**

**Ans. (c)**

**14.Soil conservation measures are mainly aimed at protecting which of the following?**
**(a) Plants**
**(b) Topsoil**
**(c) Sub soil**
**(d) Soil organisms**

**Ans. (b)**

**15.Soil contains rock particle and_____.**
**(a) water and air**
**(b) water and plants**
**(c) minerals, organic matter, air and water**
**(d) water, air and plants**

**Ans. (c)**

**16.Humus refers to the:**
**(a) top most layer**
**(b) bottom layer**
**(c) rotting dead matter in soil**
**(d) None of these**

**Ans. (c)**

**17. Cotton is grown in**
**(a) Clayey soil**
**(b) Loamy soil**
**(c) Laterite soil**
**(d) Sandy loam soil**

**Ans. (d)**

**18. Earthworms are called**
**(a) Natural decomposer**
**(b) Farmers enemies**
**(c) Farmers friend**
**(d) Plant destroyer**

**Ans. (c)**

## DAV PUBLIC SCHOOL, PTPS PATRATU

**CLASS: 7 SUBJECT: Chemistry (NOTES)**

## LESSON: 16 (WATER)

### *Water on Earth:*

- Nearly three-fourth of the surface of earth is covered with water.
- About 97% of total water on earth is present in oceans and seas. This is saline water and hence is unfit for human consumption.
- 3% of total water on earth is available in the form of freshwater.
- 2% of total water is available in frozen form in glaciers and ice-caps.
- 0.7% of total water is available as groundwater.
- 0.3% of total water is available as surface water; in rivers, lakes and streams.
- Groundwater and surface water make 1% of total water, which is available for human consumption.

### *Local Sources of Water:*

Water is supplied by the water supply system in cities. In villages, people take water from rivers, ponds, wells and tube-wells.

***Groundwater and Water Table:*** Most of the rainwater and water from rivers seep through the soil and goes under the ground. This water is trapped in the space between the underground rocks. The upper level of this water is called water table. The water below the water table is called groundwater.

***Scarcity of Water:*** People in most of the places face acute shortage of water. Due to increased human activities, forests have been cleared on large scale and new constructions have come up. This has disturbed the natural process of recharging the groundwater. Growing human population has resulted in an ever increasing demand for potable water. There is a mismatch between demand and supply for potable water. As a result, water scarcity is a major problem in modern times.

***Water Management and Rainwater Harvesting:***
Rainwater should be collected in underground tanks and allowed to seep under the ground. This practice is called rainwater harvesting. Rainwater can also be collected in tanks so that it can be used for daily needs.
Use of sprinklers and drip irrigation helps in conservation of water.
Unnecessary cutting of trees should be stopped. More trees should be planted.
We should follow these steps to conserve water:

Turn off the tap while brushing your teeth.
Leaking tap should be immediately repaired.
Plants should be water with a mug instead of a pipe.

***Wastewater Management:***
The water which flows in the drain from our houses is called wastewater. The wastewater is called sewage. Sewage goes into the sewerage system through which it is finally flown into a nearby waterbody.

Wastewater should be treated before being flown into the nearest waterbody. This is important from two angles. Treated wastewater is safer for aquatic animals and plants and is safe for human beings also. Treated wastewater can be used for many useful purposes; especially for irrigation.

***Our Role in Wastewater management:***

- Reduce the quantity of wastewater being produced from our homes.
- Do not throw solids; like food, leaves, cotton, polythene bags, etc. in the drains.
- Do not throw cooking oil in the drains.
- Do not throw chemicals; like paints, medicines, engine oil, etc. in the drain.

# WORKSHEET

***Fill in the blanks.***

**1. About 97 % of water is present in oceans and seas.**

**2. Only 0.3 per cent of fresh water available for use is present in rivers, lakes and streams.**

**3. Ground water is drawn from wells, tubewells and handpumps.**

**4. Use of sprinkler and drip technique for irrigation reduces wastage of water.**

**5. The network of pipes which carries waste water to water treatment plant is called sewerage system.**

**6. People obtain groundwater through tube wells and hand pumps.**

**7. Three forms of water are ice, water and water vapour.**

**8. The process of water seeping into the ground is called infiltration.**

**9. Water exists in three forms on Earth: solid, liquid, and gas.**

**10.The constant circulation of water in nature is known as the water cycle.**

**11. Oceans and seas cover two third of the earth's surface.**

**12. People obtain groundwater through well and tubewell.**

**13. Collecting and storing rainwater is called water harvesting.**

**14. Evaporation is responsible for cloud formation.**

**15. The water in the oceans and seas has many salts dissolved in it.**

***Multiple Choice Questions:***

**1. The continuous process of water moving between the earth and the atmosphere is known as the—**

**A)** Water Table
**B)** Water Cycle
**C)** Infiltration
**D)** Transpiration
**Answer: B**

**2. Which of the following is considered the purest form of natural water?**

**A)** Ground water
**B)** Ocean water
**C)** River water
**D)** Rain water
**Answer: D**

**3. The upper level of the underground water, below which the soil and rocks are completely saturated with water, is called the—**

**A)** Water Table
**B)** Aquifer
**C)** Water Cycle
**D)** Water Footprint
**Answer: A**

**4. Which of the following states of water corresponds to ice, snow, and glaciers?**

**A)** Gaseous State
**B)** Liquid State
**C)** Solid State
**D)** Plasma State
**Answer: C**

**5. Which of the following is an unsustainable practice that leads to the depletion of the water table?**

**A)** Reforestation
**B)** Rainwater harvesting
**C)** Deforestation
**D)** Drip irrigation
**Answer: C**

**6. Which of the following activities does NOT cause water pollution?**

**A)** Dumping untreated industrial waste into rivers
**B)** Discharging untreated domestic sewage
**C)** Rainwater harvesting and conservation
**D)** Excessive use of chemical fertilizers
**Answer: C**

**7. What turns water from the earth's surface into water vapor during the water cycle?**

**A)** The Moon **B)** The Sun **C)** Ocean currents **D)** Groundwater
**Answer: B**

**8.Water in its ____form is available in oceans.**
a.) Solid
b.) Liquid
c.) Gases
d.) None of these
**Answer** – b.) Liquid

**9. Only___ % of fresh water is present.**
a.) 8%
b.)10%
c.)15%
d.) 3%
**Answer** – 3%

**10.____ will cause an increase in the level of carbon dioxide gas in the atmosphere.**
a.) Planting of trees
b.) Cutting of trees
c.) Watering of plants
d.) Both a and b
**Answer** – b.) cutting of trees

**11. Due to increase in population, the demand for usable water has .**
a.) Decreased
b.) Increased
c.) No change
d.) None of these
**Answer** – b.) Increased

**12. The top level of the ground water is called**
a.) Ground level
b.) Sea level
c.) River level
d.) Water table
**Answer** – d.) Water table

***Question Answer:***

**1.) Name the three forms in which water exists on the earth.**
Answer: Ice which is solid , Water which is liquid and water vapour that is a gas.

**2.) Give the meaning of the term 'water table'.**
Answer: The upper most layer of groundwater is called the water table.

**3.) Name two methods of drawing out ground water.**
Answer: Two methods of drawing out ground water are as follows- through wells, through water pumps
**4.) Name two activities which lead to the formation of sewage.**
Answer: washing clothes in waterbodies, bathing in them.

**5.) State any two precautions that can help avoid the 'choking of drains.**

Answer: two precautions that can avoid choking of drains are –

Not throwing solid wastes especially plastic bags

By not throwing chemicals and oils , also not letthing weeds grow within them.

**6.) How is increase in population responsible for shortage of water?**
Answer:As the population grows, so does the need for water. Because there is more demand than there is supply, there could be a water shortage. Water sources could also become less useful as a result of contamination as the population expands. A region's ability to store rainwater and replenish aquifers declines when more people move there because they have a tendency to occupy more area.

**7.) Discuss, in brief, how 'rain water harvesting' can be done.**
Answer: Rainwater harvesting is a method for collecting and preserving rainwater for later use. Rainwater can be captured from rooftops and other surfaces that collect it in order to accomplish this and stored into buckets, storage tanks, or other sites for later use. Another option for subsurface storage is to employ infiltration water wells or groundwater recharge systems. Rainwater collecting has a variety of applications, including for domestic usage, agriculture, and animal protection. Around the world, people collect rainwater, which might be a significant supply of water for houses and communities.

**8.) Discuss any two causes that lead to a decrease in ground water level.**
**Answer: 1.) Over-Exploitation:** The excessive extraction of groundwater for industrial, agricultural and domestic purposes leads to a decrease in the water table. This occurs when extraction exceeds the rate of replenishment, leading to a decrease in the groundwater levels.
**2.) Climate Change:** Climate change has led to an increase in the frequency and intensity of droughts, resulting in lowered groundwater levels. This occurs as a result of reduced precipitation, higher temperatures, and increased evaporation.

**9.) How can 'better management of water resources' help in conservation of water?**
Answer: By lowering water waste and increasing water consumption effectiveness, effective groundwater recharge management can support water conservation. This can be achieved by putting in water-saving fixtures, collecting as well as using

rainwater, and employing other water-saving techniques. Additionally, improved management of water resources may help identify and lessen water contamination, protecting and conserving the current water supplies.

**10.) Write, in brief, about the basic details and the role of the 'sewerage system'.**
Answer: The sewerage system is a network of pipes, valves, as well as treatment centers used to collect and remove wastewater from houses and businesses. The system that gathers wastewater from faucets, restrooms, as well as other sources, transports it to a treatment center, processes it as needed, and then appropriately disposes of it. Because it removes contaminants from water sources, lowers the frequency of diseases spread by polluted water, and guards against water contamination, the sewage system is essential for maintaining public health.

**11.) Explain rain water harvesting.**
**Answer** – Rain Water Harvesting-
Rain water should be collected in underground tanks and allowed to seep through the soil. This will
replenish the ground water. Rain water can also be collected in open tanks and used for daily needs.
This is called rain water harvesting.

**12.) How we can maintain water to be polluted and maintain a clean surrounding?**
**Answer** – Water can be maintained by some following rules given below:-
a.) Reduce the quantity of waste water being produced in our homes.
b.) Do not throw solids, like leftover food, leaves, cotton, polythene bags, etc.
c.) Do not throw cooking oil in the drain.
d.) Do not throw chemicals, like paints, medicines, engine oil, etc., in the drain. These chemicals kill the (friendly) micro-organisms, present in the sewage, which help to purify water.

**13.) What does contaminated water causes?**
**Answer**– Contaminated drinking water can cause diseases like cholera, typhoid, jaundice, etc.

**14.) How we can save water?**
**Answer** – We should save water by following –

a.) Turn off the tap while brushing teeth.
b.) Get the leaking taps repaired immediately.
c.) water the plants with a mug instead of a pipe.

**15.) What are the reasons of shortage of water?**
Answer – The major reasons of shortage of water are given below:
a.) Water bodies on earth receive water mainly from rainfall. The amount of rainfall in most regions has decreased. This has happened due to many factors.
b.) Some of them are deforestation, increase in construction activity, increase in number of vehicles and industries. As the amount of rainfall decreases, farmers depend more on ground water for irrigation.