

3. Hydrosphere

Improve your learning

1 A. Question

Find the odd one out and give an explanation for your choice.

- A. Evaporation
- B. condensation
- C. salination
- D. precipitation

Answer

Salination is the term used to find the involvement of salt content in water. It is mainly used to determine the salt content in the sea water.

But the evaporation, condensation and precipitation are the stages involved in the water cycle.

Evaporation: Water gets transformed into liquid gaseous form and it gets mixed to the atmosphere. This process is known as evaporation.

Condensation: It is the process which involved in bringing back the water to the earth surface which has evaporated to the atmosphere. The water reaches the earth's surface in the form of tiny droplets.

Precipitation: it is the mechanism or transportation process in which the condensed water is reached the earth's surface. Main forms of precipitation are drizzling, rain, snow, sleet and hail.

1 B. Question

Find the odd one out and give an explanation for your choice.

- A. Tectonics
- B. centrifugal force
- C. solar energy
- D. precipitation

Answer

Centrifugal force, solar energy, precipitation and effects of wind are factors affecting ocean current. But tectonics is the plates which are on the earth's surface.

- **Centrifugal force:** Centrifugal force is the outward force on mass when the earth is rotating. It is the force away from the axis, opposite to the direction of the gravity in the equator. It is necessary to keep the masses in a straight line.
- **Precipitation:** It is the mechanism or transportation process in which the condensed water is reaches the earth's surface. The equatorial areas receive the greatest rainfall hence the sea level is higher. This contributes majorly towards the sea level in the earth.
- **Solar Energy:** solar energy is the conventional source of energy which increases energy by the way of heating. Heating by solar energy causes the water to expand. And also the evaporation takes place due to solar energy and increases the salt content in the soil.
- **Tectonics:** The lithosphere is broken into a number of plates which is known as tectonic plates. These plates move slowly because of the movement of molten magma inside the earth's surface.

2. Question

Correct the false statements.

- (a) Oceans trenches can be located near the continents
- (b) Relief features of the oceans are like plains
- (c) Most salts in the seas are washed into it from the land over centuries
- (d) The temperature of ocean water remains the same across the globe

Answer

- (a) True

Explanation

These areas are the deepest parts of the oceans. The trenches are relatively steep-sided, narrow basins. They occur at the bases of continental slopes and along island arcs and are associated with active volcanoes and strong earthquakes

- (b) True

Explanation

Ocean relief is largely due to the tectonics, volcanic, erosional and depositional processes and their interactions. The ocean relief is divided into minor and major relief features. Major ocean relief is divided into four parts. They are Continental Shelf, Continental slope, Deep Sea plain and Trenches.

Minor ocean relief features are Ridges, hills, seamounts, trenches, island arcs, submerged volcanoes and sea crabs.

(c) True

Explanation

Most of the salt in the ocean water is because of the rainwater discharged from the land. The rainwater is not in the purest form. It contains small portions of salts, particles and nutrients that make it salty. The surface run-off also comprises small amounts of sodium chloride or salts from the minerals thus depositing it in the sea. Since the rate of evaporation is higher in the sea, large amounts of salts are left behind which is again reinforced by the salts from the surface run-off making the sea salty.

(d) False

Explanation

Ocean water does not always have a unique temperature in the overall globe. But they do not have major changes such as earth surface has, even these minor changes will show a great impact. The temperature of the ocean water varies from 2°C to 29°C. El-Nino and Al-Nino are the effects caused by the changes in the temperature of the Pacific Ocean. Even the temperature varies inside the ocean water when we go deep inside the ocean temperature falls.

3. Question

Do you think the description of a blue planet is accurate? Describe any one way your activity impacts its oceans.

Answer

The description of the blue planet is accurate for the earth. It is said to be a blue planet because most of the surface is covered with water and hence it makes a blue colour. 71% of the earth's surface is covered with water and only 29% is land. Earth is the fifth largest planet in the solar system and third when compared to the distance from Sun. Earth is the unique planet which supports life for human sustenance. Water is the main reason for the availability of life on earth.

The ocean is the main water body which makes the planet earth blue. There are many human activities which have an adverse effect on the oceans, water bodies and ice glaciers. One such activity which has the most impact on the ocean is global warming. Global warming increases in the earth's temperature due to an increase in human activities. It occurs due to the climate changes that happen in the earth.

The average earth's temperature is increased due to global warming by the greenhouse gases. The greenhouse effect is the absorption and emission of infrared radiation and CFCs gases that are emitted by human beings on the planet. The atmosphere gets polluted and these gases get trapped in the ozone layer which will increase the temperature of the earth by depleting the ozone layer. The ozone layer is the layer which protects the earth from the harmful

rays of the Sun. When the temperature of the earth raises the ice glaciers in the Arctic region and Antarctic region starts melting and increases the sea level which is harmful to the earth.

In this way, human activity has an adverse impact on the oceans and earth.

4. Question

Why are there differences in the salinity of oceans?

Answer

The salinity of Oceans is due to the following reasons :

- a. For over million of years rain, rivers and streams washed away the salt compound from rocks and carried it to the seas.
- b. Some salinity in the oceans is due to undersea volcanoes.
- c. When the water evaporates the salt is left behind.

The above processes continued for millions of years and resulted in salinity of the seas.

Causes for the difference in salinity level:

- a. there are regions on earth that have scanty rainfall and dry winds cause lots of evaporation, as we know evaporation tends to increase the salinity. Hence the sea water nearer to that regions is salty and denser. Example: North and South Atlantic regions.
- b. Then there are some regions that have an abundance of rainfall, so as the rain is a source of freshwater it dilutes the sea water and reduces the salinity.

5. Question

How is human life depends upon oceans?

Answer

Oceans covers 70% of the earth' surface. Hence Oceans play a pivotal role in the existence of human life as well as the entire living organism kingdom.

The importance of Oceans are:

- a. Biodiversity: The oceans are home to a number of species of organisms that have high biodiversity. Example: Coral reefs, Salt marshes, estuaries, mangroves etc.
- b. Natural Resources: The bottom of the Ocean floor holds minerals, including oil and natural gas, which is used for meeting energy requirements.
- c. Climate and weather: As the air passes over warm waters, it rises due to warming. As it cools, condensation of the water creates rainfall. If the air passes over cooler waters, it cools and sinks. Air moves from high to low-

pressure areas. Hence it has an important role in maintaining the temperature.

d. There are many other important uses like the oceans are used as transportation medium, water cycle and economy of countries.

6. Question

Observe the map 1 on page 35 and write down the names of warm and cold currents. (AS₅)

Answer

Ocean Current is the general movement of ocean water in mass towards a specific direction. They are caused due to the following factors:

a. heating of ocean water by solar energy: Heating causes the water to expand, hence ocean water is warmer near the equator than the middle latitudes. So flow is normally from east to west.

b. Wind.: this pushes the water to move in its direction.

c. Gravity: This tends to pull the water down to the pile.

d. Coriolis force: The Coriolis force intervenes and causes the water to move to the right in the northern hemisphere and to the left in the southern hemisphere.

e. Temperature difference

f. Salinity difference

Based on the factors there are two types of currents:

a. warm Current: Warm-water currents travel out from the equator along the surface, flowing towards the poles to replace the sinking cold water.

b. Cold Current: Cold-water ocean currents occur when the cold water at the poles sinks and slowly moves towards the equator.

Warm currents are:

North Atlantic Current, Gulf Stream, North & South equatorial current, North Pacific current Kuroshio Current, Brazil current, South Atlantic Drift, Agulhas Current, South Indian Current, East Australian Current.

Cold Currents are:

Canary Current, California Current, Benguela Current, west Australian Current and Peru Current.

7. Question

Read the para 'Ocean as a Resources' on page 33 and comment on it.

Answer

Ocean has millions of life under it. It is a huge source of resources for mankind.

- a. It provides foods like fish, salt etc.
- b. We derive building materials like sand, gravel etc from it.
- c. We extract minerals like chlorine, fluorine, iodine, oil and natural gas.
- d. The ocean is also used for generating power.
- e. It is a medium for transportation and add to a country's economy through export and import business.
- f. But today humans have overused the resources and converted the Oceans into a dumping ground.
- g. There are many species of fish and whales that have extinct due to the chemicals that are spilled into it.
- h. Many plastics and other forms of toxic waste have threatened the life under water.