

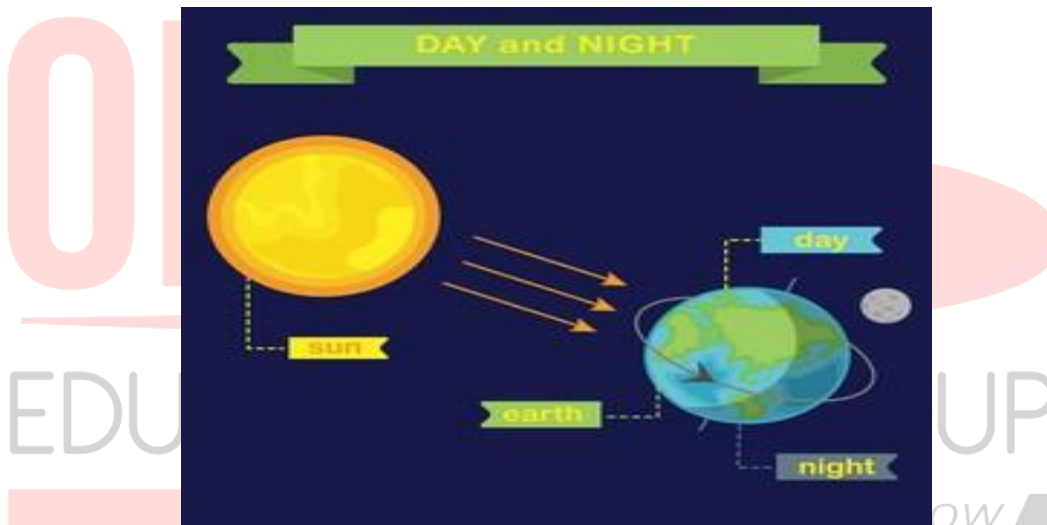
## Chapter- 1

# Air, Water, And Weather

## STUDY NOTES

### SUN BRINGS OUT CHANGES IN WEATHER

- ❖ The heat of the sun affects the movements of air and changes the form of water, which brings about a change in the weather.
- ❖ Weather is the conditions of the atmosphere surrounding us at a particular time, in terms of temperature, atmospheric pressure, wind, and moisture.
- ❖ The weather can be hot, cold, windy, dry, or humid.



### HUMID:

- ❖ When you feel sticky and sweat doesn't dry, It is humid because there is a lot of moisture in the air.

### THE SUN CAUSES WINDS TO BLOW

- ❖ The movement of the wind is affected by the heat of the sun.
- ❖ The heat of the sun heats the air.
- ❖ After heating, the air becomes lighter and rises.
- ❖ The heavier cool air moves in to take its place.

## THE SUN CHANGES IN THE STATES OF WATER

- ❖ We know that clouds bring us rain.
- ❖ How are these clouds formed?
- ❖ The heat of the sun changes water into water vapor.
- ❖ This water vapor rises and forms clouds.
- ❖ When clouds become too heavy, they fall as rain.
- ❖ When vapor falls as snow when the atmosphere is extremely cold.

## AIR

- ❖ We know the air is all around us.
- ❖ We also know air contains water vapor, smoke, dust, and germs.
- ❖ Around the earth is a thick layer of air. Moving air is called wind.
- ❖ Fast and strong winds can cause a storm.
- ❖ Let us read about air currents.

## HOT AND COLD AIR

- ❖ We need to know how hot and cold air moves to learn about air currents.

## HOT AND COLD AIR

**HOT AIR:** Air that has been heated and tends to rise.

**COLD AIR:** Air which is having little warmth, becomes heavier and denser than hot air.

**ACTIVITY 1:** Light a candle. Hold it in different positions as shown in fig below. Watch its flame. Does the direction of the flame change as you tilt the candle?



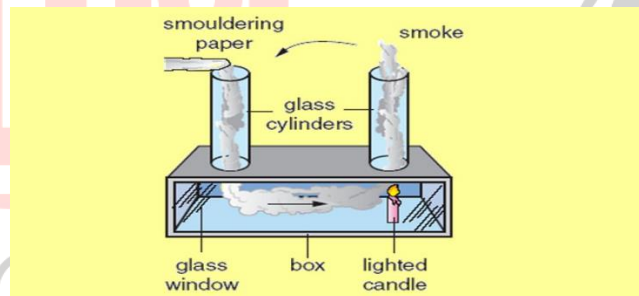
**Activity 2:** Bring your hands close to the sides of the flame first and then above it. You will find that the air by the sides of the flame is not as hot as the air above. It proves that hot air rises. Why does hot air rise? Why does hot air rise? Let us see why.



### HOT AIR ALWAYS RISES.

#### ACTIVITY 3

- ❖ Take a cardboard or wooden box with a glass front.
- ❖ Fit two wide glass tubes in holes at the top to form chimneys.
- ❖ Put a small lighted candle below one of the chimneys.
- ❖ Hold a smouldering piece of paper at the top of the other chimney.
- ❖ Thus, air currents are set up.



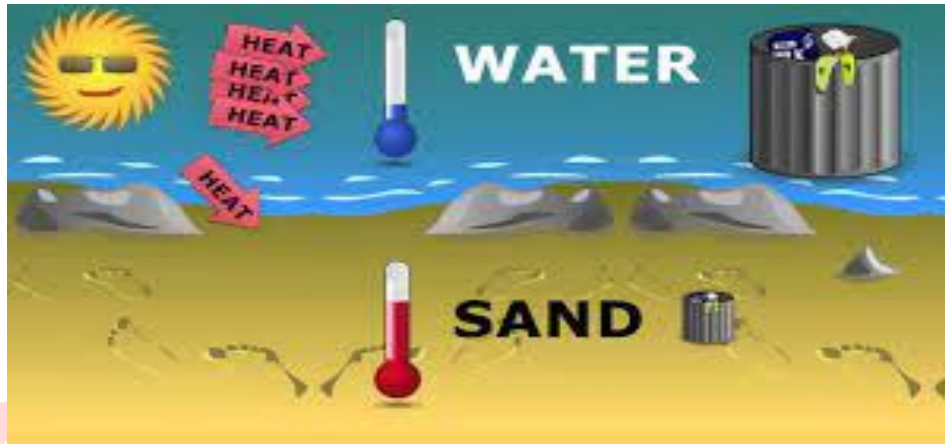
#### LAND BREEZE AND SEA BREEZE

Let us do an activity.

#### ACTIVITY 4

- ❖ Take two bowls. Fill sand in one and water in the other.
- ❖ Keep both out in the sun.
- ❖ After two hours, use a thermometer to measure the temperature inside each bowl.
- ❖ Which is warmer- sand or water?
- ❖ Note the observation in your notebook.
- ❖ Outdoors: temperature of the sand, the temperature of the water
- ❖ Indoors: Temperature of sand, the temperature of the water
- ❖ In the given period, sand and water do not disturb absorb or reflect the same amount of heat.
- ❖ As you can see from the table, sand (or land) absorbs heat faster than water.

- ❖ It also cools down faster than water does.
- ❖ On the other hand, water absorbs and loses heat more slowly than land.
- ❖ Land and water do not absorb or lose the same amount of heat in the same period.
- ❖ This difference gives rise to a land breeze and a sea breeze during the day.

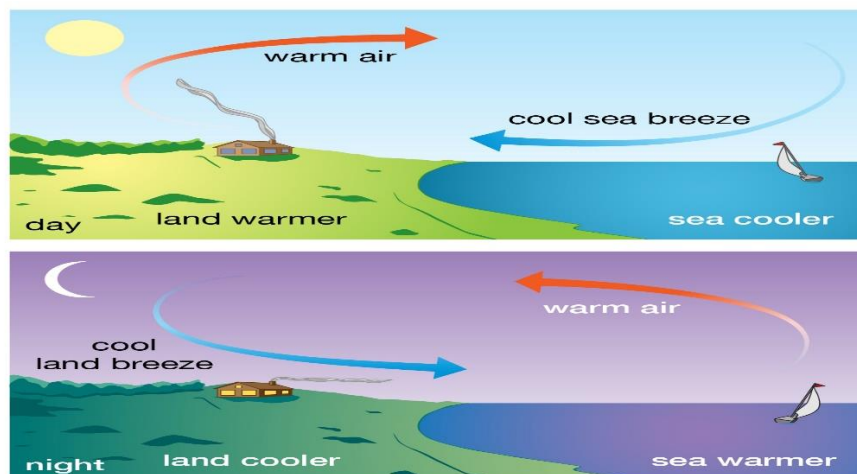


### SEA BREEZE

- ❖ During the day, the land gets heated quickly but the sea does not.
- ❖ When the air above the hot land gets heated, it rises as hot air is lighter.
- ❖ Cool air over the sea rushes in to take its place.
- ❖ Thus, a cool breeze blows towards the land during the day.

### LAND BREEZE

- ❖ At night, the land cools down faster than the sea.
- ❖ So the sea is warmer than the land.
- ❖ The hot air above the sea rises.
- ❖ The cooler air from the land blows towards the sea to take its place.



**WATER**

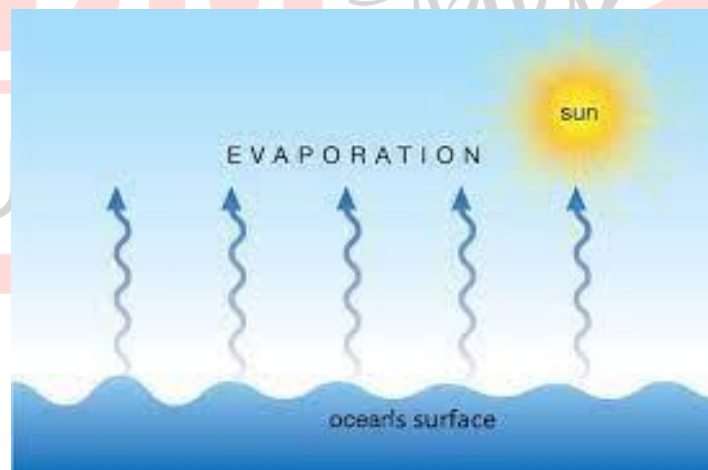
- ❖ About 71% of the earth's surface is covered with water.
- ❖ Water is not found only in rivers, seas, and oceans, but it is also found underground.
- ❖ It is even present in the air.
- ❖ Water changes its form on heating and cooling.

**EVAPORATION**

- ❖ The process of change of water into water vapor due to heating is called evaporation.

Evaporation of water takes place at a faster rate when

- ❖ There is a strong wind,
- ❖ The exposed surface of the water is large,
- ❖ The temperature of the surroundings is high,
- ❖ The air is dry.
- ❖ Water vapor goes up in the atmosphere and forms clouds.
- ❖ These clouds fall on the earth as rain.
- ❖ Water vapor also forms dew, frost, fog, and snow.

**CONDENSATION:**

- ❖ When water vapor cools down it changes into drops of water. This is called condensation.
- ❖ Ice water and water vapor are three forms of water.
- ❖ However, in nature, we can see water in the form of fog, dew, frost, hail, and snow as well.

- ❖ FOG: This occurs when thick clouds of tiny drops of water form just above land or water.
- ❖ DEW: When the water vapor in the air condenses and appears as droplets on the ground and other surfaces, it is called dew.
- ❖ FROST: When it is very cold, the dew or surface water freezes into tiny white crystals. This is called frost.
- ❖ HAIL: When raindrops pass through a very cold region of the atmosphere, they freeze and become hail.
- ❖ SNOW: When water vapor is suddenly cooled, it freezes into tiny white snowflakes.



### **IMPURITIES IN WATER**

- ❖ The water in wells and rivers is impure due to the presence of
  - a. insoluble impurities
  - b. soluble impurities
  - c. disease-causing germs

## PURIFICATION OF WATER

- ❖ **SEDIMENTATION:** Settling down heavy insoluble impurities in a liquid.
- ❖ **DECANTATION:** Gently pour liquid into another vessel after sedimentation.
- ❖ **FILTRATION:** Purifying impure liquid by straining.

Though we can obtain clear water by these methods, water may still contain germs, and be unfit for drinking. So, we must purify the water to make it safe for drinking.

- ❖ Chemicals like chlorine are used to kill germs at the waterworks of a city. The process of adding chlorine is called chlorination.
- ❖ Bleaching powder also kills germs in the water.
- ❖ If well water has to be used, potassium permanganate should be used to purify it.
- ❖ The safest method of purifying water is to boil it, as boiling destroys germs.
- ❖ We can also use a water filter for cleaning water.

## UNDERGROUND WATER

- ❖ Water changes its form and moves in a cycle in nature.
- ❖ Water that falls like rain and the water that we throw away goes down into the ground.
- ❖ It seeps through the topsoil, the subsoil, and porous rocks.
- ❖ It finally settles below the porous rocks as it cannot pass through the non-porous rocks.
- ❖ So, there is the large storage of underground water.
- ❖ We draw out this underground water from tubewells and wells.
- ❖ Dry places have less underground water.
- ❖ The level of underground water in an area is called the water table.
- ❖ Water is a precious natural resource.
- ❖ We should use it carefully. We should not wastewater.

### **IMPROVE YOUR GK.**

- ❖ Most of the water wasted in a kitchen comes from when you soak pulses/grains or wash pasta/dal before cooking. The cool water is perfect for your plants. Instead of straining the water into the sink, do it in your **garden** instead. You will save water and the time you spend on watering plants.

### **TEACHER'S NOTE:**

- ❖ Ask the children to relate their experiences of weather change.
- ❖ Conduct experiments to show air currents, sediments, decantation, and filtration.
- ❖ Ask them to repeat these at home.
- ❖ Discuss different ways of purification of water.

- ❖ Children can find out the names of new brands of water purifiers.

### LET'S ANSWER

#### A. Tick the correct answer.

- Changes in the weather are caused primarily due to  
a. sun            b. clouds            c. rain            d. wind
- Clothes take a long time to dry  
a. when the weather is windy  
b. When the air is wet  
c. when the temperature is high  
d. when the air is dry
- The process of changing liquid water into water vapor is known as  
a. evaporation            b. condensation            c. chlorination            d. decantation
- Which of the following is not a way of purifying water?  
a. sedimentation            b. chlorination            c. filtration            d. cooling
- Frost is formed when it is  
a. very hot            b. windy            c. raining            d. very cold

#### B. Change the underlined words to make correct statements. Rewrite the correct statements in your notebook.

- The season changes from day to day.
- The revolution of the earth on its axis causes day and night.
- In winter the days are longer.
- A flame burns downwards.
- Hot air is heavier than cold air.
- In coastal areas hot winds blow towards the land during the day.
- Fog is caused by tiny white flakes falling from the sky.

#### C. Write short answers.

- What do you mean by weather?
- How is condensation different from evaporation?
- What are the two types of impurities in water?



4. What is chlorination?
5. Define the water table of an area.

**D. Answer these questions.**

1. What is a land breeze? How does it occur?
2. How is hail different from the snow?
3. What are the different ways of purifying water?

**ANSWERS**

A1. Sun

2. When the air is wet

3. evaporation

4. cooling

5. very cold

B1. The weather changes from day to day.

2. The rotation of the earth on its axis causes day and night.

3. In summer the days are longer. *Changing your Tomorrow* ▲

4. A flame burns upwards.

5. Hot air is lighter than cold air.

6. In coastal areas cold winds blow towards the land during the day.

7. Snow is caused by tiny white flakes falling from the sky.

C1. Weather is the state of the atmosphere at a particular place and time as regards heat, cloudiness, dryness, sunshine, cold, wind, rain, etc.

2. Condensation is the change from a vapor to a condensed state (solid or liquid). Evaporation is the change of a liquid to a gas.

3. The two types of impurities are dissolved and suspended solids.
  4. A chemical element that is a greenish-yellow gas of strong odor used as a bleach and as a disinfectant to purify water.
  5. The level of groundwater in an area is called the water table.
- D1. A blowing breeze from land towards the sea is called a land breeze.
- They are formed during the night when seawater and land both lose heat, the specific heat capacity of the land is very low compared to that of seawater, the land loses heat energy fast and cools more rapidly than the sea.
2. When the droplets get to a certain size, the clouds are no longer be able to hold them all so they start to fall. It is at this point the hailstones are that big they do not have enough time to meet before landing. This is the only way hailstones can be formed compared to snow created on fronts.
  3. The different ways of purifying water :
    - a. Chemicals like chlorine are used to kill germs at the waterworks of a city. The process of adding chlorination is called chlorination.
    - b. Bleaching powder also kills germs in the water.
    - c. If well water has to be used, potassium permanganate should be used to purify it.
    - d. The safest method of purifying water is to boil it, as boiling destroys germs.
    - e. We can also use a water filter for cleaning water.

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