Science

Textbook for Class VI

पु॰ना International School
Shree Swaminarayan Gurukul, Zundal

CLASS –VI

SCIENCE

SPECIMEN

COPY

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Chapter – 12
Electricity and Circuits

Key words:

- **Electiricity :-** It is a flow of electic current.
- **SOURCES OF ELECTRICAL ENERGY:-** Electrical energy is available to us from electric power houses, domestic generators, batteries, and dry cells.
- **Electric Current :-** The Electric current is a flow of electric charges (electron).
- Electric current flows in one direction only.
- **Electric Circuit:** The complete path from one terminal of the cell (say positive) through the bulb and back to the other terminal of the cell (say negative) is called an electric circuit .
- **CLOSED CIRCUIT** :- An unbroken path travelled by electricity is known as a CLOSED CIRCUIT.
- **OPEN CIRCUIT** :- A broken path is known as an OPEN CIRCUIT.
- **Circuit Diagram:** It is a symbolic representation of the electric circuit and the electrical parts (electrical components) .

Component of Electricity:

1. **Connecting wires**: Help to conduct the electric current and complete the circuit. A metalic wire used for connections in an circuit is also called a 'lead'.
2. **Bulb:** Lights up when an electric current flows through it. An electric bulb has a filament that is connected to its terminals. An electric bulb glows when electric current passes through it. The filament of an electric bulb is made of a tiny , coiled tungsten wire.
3. **Battery**:- A series combination of two or more cells.
4. **Switch**: Switch is a simple device that is used to either break the electric circuit or to complete it. When a switch is on, a gap in the circuit is bridge by a conducting material through which the current flows.
5. **Electric cell or dry cell** : An electric cell has two terminals; one is called positive (+ ve) while the other is negative (– ve).

Connecting wires, bulb, switch and electric cell is used in Torch, Battery, LED (Light Emitting Diode), etc.

Electric current is carried by Conductor.

Conductor: Materials that allow electric current to pass through them. All metals are good conductors of electricity. Carbon is the only non-metal which is a good conductor of electricity.

Electric current is stopped by Insulators.

Insulators: Materials which do not allow electric current to pass through them. Example: plastic, rubber, wood, glass, polythene, PVC, etc.

Electricity can give us magnetism

Electricity is a form of energy which helps us with ,

- heating effect,
- light effect , and
- magnetic effect.

VERY SHORT ANSWER QUESTIONS

1. In which of the following circuits A, B and C given in Fig. 12.4, the cell will be used up very rapidly?

Fig. 12.4

Ans. In arrangement A, the cell will be used up very rapidly.

2. Fig. 12.5 shows a bulb with its different parts marked as 1, 2, 3, 4 and 5. Which of them label the terminals of the bulb?

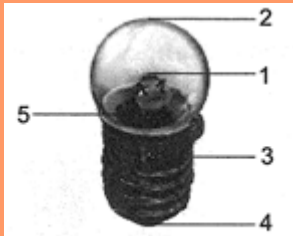


Fig. 12.5

Ans. Labels 3 and 4 mark the terminals of the bulb.

SHORT ANSWER QUESTIONS

1. You are provided with a bulb, a cell, a switch and some connecting wires. Draw a diagram to show the connections between them to make the bulb glow.

Ans.

2. Will the bulb glow in the circuit shown in Fig. 12.6? Explain.


Fig. 12.6

Ans. No, bulb will not glow because the circuit is incomplete due to open switch which lead not to flow current from one terminal of cell to another.

3. An electric bulb is connected to a cell through a switch as shown in Fig. 12.7 When the switch is brought in 'ON' position, the bulb does not glow. What could be the possible reason/s for it? Mention any two of them.

Ans. The bulb did not glow due to the following reasons:

(i) The bulb is fused.
(ii) The cell is a used one.
(iii) The connections may be loose
(iv) There may be carbon content near the terminals of the cell.

4. A torch requires 3 cells. Show the arrangement of the cells, with a diagram, inside the torch so that the bulb glows.

Ans. Positive end of one cell is connected to negative end of other, this makes a series to complete the circuit in a torch.

5. When the chemicals in the electric cell are used up, the electric cell stops producing electricity. The electric cell is then replaced with a new one. In case of rechargeable batteries (such as the type used in mobile phones, camera and inverters), they are used again and again. How?

Ans. Energy neither be created nor destroyed it only change from one form to another, thus in rechargeable batteries when electric current is passed through them it converted into chemical energy. After getting recharged they can be used again.

6. Paheli connected two bulbs to a cell as shown in Fig. 12.8.

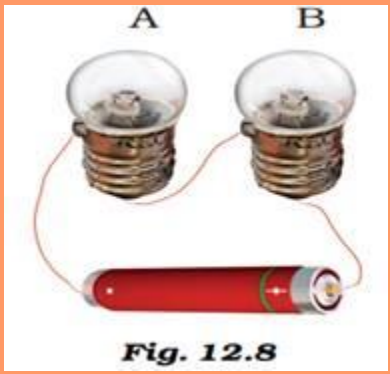


Fig. 12.8

She found that filament of bulb B is broken. Will the bulb A glow in this circuit? Give reason

Ans. No, as the circuit is broken the bulb will not glow.

7. Why do bulbs have two terminals?

Ans. An electric cell has two terminals; one is called positive (+ ve) while the other is negative (– ve). An electric bulb has a filament that is connected to its terminals.
An electric bulb glows when electric current passes through it.

8. Which of the following arrangement A, B, C and D given in Fig. 12.9 should not be set up? Explain, why.

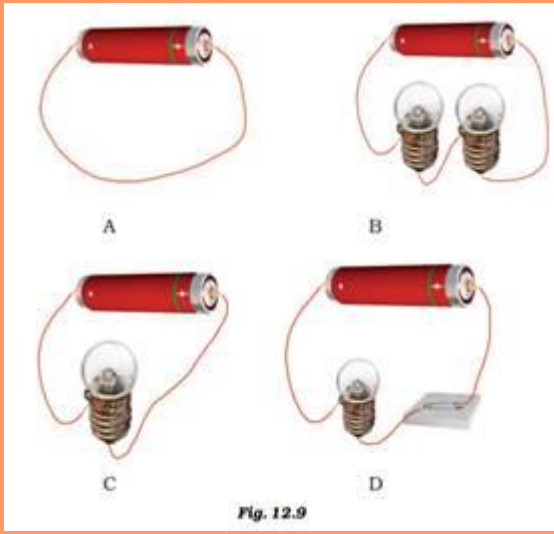


Fig. 12.9

Ans. Arrangement A is not desirable because the cell will be rapidly used up.

9. A fused bulb does not glow. Why?

Ans. A fused bulb does not glow due to broken filament leading to incomplete circuit.

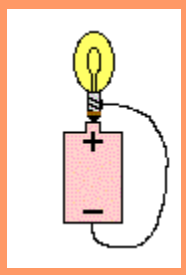
10. Paheli wanted to glow a torch bulb using a cell. She could not get connecting wires, instead, she got two strips of aluminium foil. Will she succeed? Explain, how?

Ans. Aluminium is a good conductor of electricity so current is pass through it and hence can be used as a connecting wire.

LONG ANSWER QUESTIONS

1. Boojho has a cell and a single piece of connecting wire. Without cutting the wire in two, will he be able to make the bulb glow? Explain with the help of a circuit diagram.

Ans. As shown in the diagram, the base of the light bulb connects to the positive terminal of the cell and the wire extends from the ribbed sides of the light bulb down to the negative terminal of the cell. A complete conducting loop is made with the light bulb being part of the loop. A circuit exists and charge flows along the complete conducting path and the bulb start lighting .



2. Fig. 12.10 A and B, show a bulb connected to a cell in two different ways.

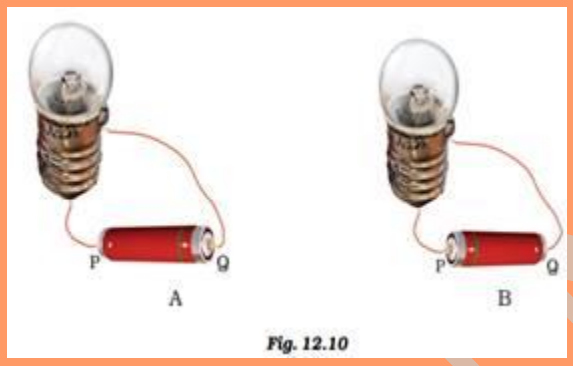


Fig. 12.10

(i) What will be the direction of the current through the bulb in both the cases.
(Q to P or P to Q)

(ii) Will the bulb glow in both the cases?
(iii) Does the brightness of the glowing bulb depend on the direction of current through it?

Ans. (i) In case of Fig. 1 current flowing will be from Q to P. whereas in case of Fig 2 current flowing will be from P to Q , as current always flow from positive to the negative terminal of the electric cell.

(ii) Yes , because circuit is completed in both the cases.

(iii) No.

11. Think of six activities which use electric current. Also name the devices used to perform the activity.

Activity you perform	**Device**
Example: Get light	Torch
____	____
____	____

____	____
____	____

Ans.

Activity you perform	**Device**
Example: Get light	Torch
Making sandwich	Sandwich maker
Cooking food	Heater/microwave
Heat water	Geyser/immersion rod
Listen to music	CD player/radio/i-pod

12. A torch is not functioning, though contact points in the torch are in working condition. What can be the possible reasons for this? Mention any three.

Ans. The reasons could be as follows:

(a) Bulb may be fused, if the filament of the bulb is broken so circuit is not completed and hence the current not flow .
(b) The cell may not be properly connected in series.
(c) The switch may have a problem.

TEXTUAL EXERCISE

Question 1. Fill in the blanks:

(i) A device that is used to break an electric circuit is called ----------.
(ii) An electric cell has --------- terminals.

Answer: (i) A device that is used to break an electric circuit is called **switch**.
(ii) An electric cell has **two** terminals.

Question 2. Mark 'True' or 'False' for following statements:

(a) Electric current can flow through metals.
(b) Instead of metal wires, a jute string can be used to make a circuit.
(c) Electric current can pass through a sheet of thermocol.

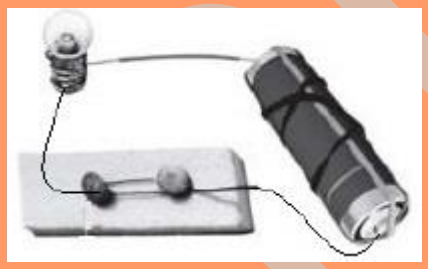
Answer: (a) Electric current can flow through metal.**True**
(b) Instead of metal wires, a jute string can be used to make a circuit.**False**
(c) Electric current can pass through a sheet of Thermocole.**False**

Question 3. Explain why the bulb would not glow in the arrangement show in Fig.

Answer: Bulb will not glow in the arrangement because the holder of the tester used in the connection is made of plastic which is an insulator. Thus, current will not flow in the circuit.

Question 4. Complete the drawing shown in Fig, to indicate where the free ends of the two wires should be joined to make the bulb glow.

Answer:



Question 5. What is the purpose of using an electric switch? Name some electrical gadgets that have switches built into them.
Answer: Switch is a simple device that is used to either break the electric circuit or to complete it.

Electric gadgets that have switches built into them are microwaves, freezes, rice cooker, automatic electric iron, toasters etc.

Question 6. Would the bulb glow after completing the circuit shown in Fig in the Q.4 if instead of safety pin we use an eraser?
Answer: No, because eraser is an insulator.

Question 7. Would the bulb glow in the circuit shown in Fig.?

Answer: No, the bulb will not glow because the wires from both terminals of the battery are connected to the one terminal of the bulb. In order to make the bulb glow, wires should be connected to the both terminals of the bulb.

Question 8. Using the "conduction tester" on an object it was found that the bulb begins to glow. Is that objected a conductor or an insulator? Explain.
Answer: That object is conductor because electricity can pass thorough only a conductor and not through an insulator. Unless the object is conductor, the bulb could not glow.

Question 9. Why should an electrician use rubber gloves while repairing an electric switch at your home?
Answer: The rubber gloves are insulators. This saves the electrician form getting an electric shock. That is why an electrician uses rubber gloves, while repairing an electric switch.

Question 10. The handles of the tools like screwdrivers and pliers used by electrician for repair work usually have plastic or rubber covers on them. Can you explain why?
Answer: Plastic and rubber, both is bad conductor of electricity. Hence they protect against electric shock.

CHAPTER – 14
Water

Key points:

WATER: NATURAL GIFT

- Water is an inexhaustible or renewable natural resource.
- Three -fourths of the earth's surface is covered with water.
- Nearly 70% of our body is made up of water and the rest is solid matter.
- Water is essential for life.
- Water which is fit for human consumption is known as **Fresh water** or **Potable water**.
- Only 2.6% of total water is fresh water.
- Only 0.01% of the total water reaches humans and animals.

SOURCES OF WATER

- Rain water
- Ground water
- Surface water
- Rivers and streams
- Lakes and pounds
- Sea water

STATES OF WATER

water on the earth exists in three states : solid , liquid and gas.

WATER AND ITS FORMS

- Ice is the solid state of water.
- Water is the liquid state of water.
- Vapour or steam is the gaseous state of water.

· Water Cycle:

The cycle of processes by which water circulates between the earth's oceans, atmosphere, and land, involving precipitation as rain and snow, drainage in streams and rivers, and return to the atmosphere by evaporation and transpiration.

Water Conservation: It is the wise and judicious use of water.

Ways of conserving water:

1. Get all leaking taps repaired.
2. Use a bucket for taking bath instead of a shower.
3. Collect rainwater and use it for gardening and recharging ground water.
4. Wash your cycles, cars, etc. with a bucket of water instead of pipes.
5. Instead of washing the floor use a mop.

· Importance of Water:

1. Digestion of food takes place in the stomach when food is mixed with water.
2. Important medium for the transportation of food, oxygen and carbon dioxide in the body.
3. Water is used to produce electricity.
4. Water is essential for the germination of seeds.
5. Water helps in maintaining the body temperature.

Excess of water: When it rains or snow, some of the water is retained by soil. Its caused flood. It effects by damage property and endanger the lives of humans and animals. Rapid run-off causes soil erosion.

Lack of water: It is the lack of sufficient available **water** resources to meet **water** needs within a region. It cause drought like condition. It effect by acute water crisis, crop failure, loss of life in all forms due to starvation.

Rainwater Harvesting: Method of collecting rainwater and storing it for use during scarcity. It can be used for several purposes including drinking, washing, gardening, flushing, etc.

- Water vapour gets added to air by evaporation and transpiration.
- The water vapour in the air condenses to form tiny droplets of water, which appear as clouds. Many tiny water droplets come together and fall down as rain, snow or hail.

- Rain, hail and snow replenish water in rivers, lakes, ponds, wells and soil.
- Excessive rains may cause floods while lack of it for long periods may cause droughts.
- The amount of usable water on earth is limited so it needs to be used carefully.

VERY SHORT ANSWER QUESTIONS

1. Look at Fig. 14.1.

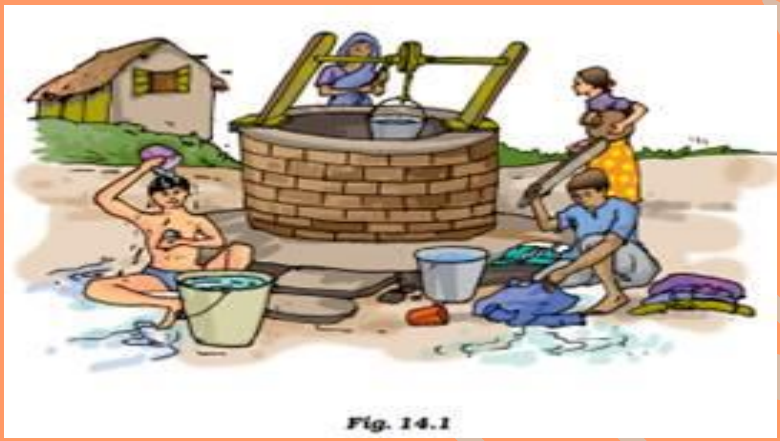


Fig. 14.1

Write down the activities shown in this figure in which water is being used.
Ans. Water is being used for washing clothes, drinking and bathing.

2. Write any two activities which require more than a bucket of water.
Ans. Washing clothes and irrigation require more than two buckets of water.

3. Write any two activities which require less than one bucket of water.
Ans. Brushing teeth and drinking require less than one bucket of water

SHORT ANSWER QUESTIONS

1. Why do wet clothes dried on a clothes line get dry after some time? Explain.

Ans. Wet clothes when dried on a clothes line get dry after sometime due to the evaporation of the water present in wet clothes and their conversion to water vapour.

2. Water kept in sunlight gets heat from the sun and is evaporated. But how does water kept under the shade of a tree also gets evaporated? Explain.

Ans. Water kept under the shade of a tree gets evaporated due to the heating up of the air during daytime due to presence of sun. The hot air provides heat and evaporates the water kept in shade.

3. How do the areas covered with concrete affect the availability of ground water?

Ans. Areas covered with concrete reduces the seepage of rain water into the ground. As water from concrete area flows into the drains thereby reducing the availability of ground water.

4. Why is there a need for conserving water? Give two reasons.

Ans. There is an urgent need to take necessary steps to conserve water even 70% of land is covered with it which is unfit for drinking. Two reasons can be

a)Increased population
b) decrease in the level of ground water

5. Fill in the blanks selecting words from the following list

snow, rain, clouds, vapour, evaporation, transpiration.

Water, as ____ goes into the atmosphere by the processes of ____ and ____ , forms ____ , which on condensation fall in the form of ____ and ____.

Ans. Water, as vapour goes into atmosphere by the processes of evaporation and transpiration, forms clouds which on condensation fall in the form of snow and rain.

LONG ANSWER QUESTIONS

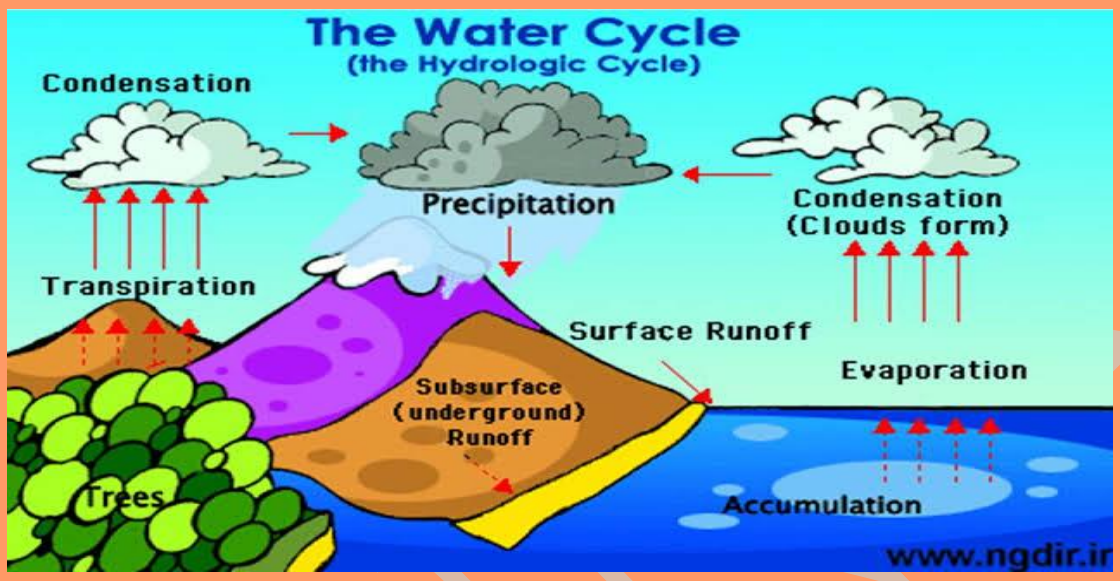
1. Most of the water that falls on the land as rain and snow, sooner or later goes back to a sea or an ocean. Explain how it happens?

Ans. The rain falling on the ground is a source of ground water. When it falls on the earth it gets seeps into ground and portion of it flows into other sources of water bodies like rivers, lake sand wells and then it flow into seas or oceans.

And when snow falls on the surface of the earth in the form of ice, snow or as a glacier. it melts and flows down in the form of rivers, lakes and gets merged with the ocean and seas.

2. Draw a diagram to show how sea water reaches a lake or pond.

Ans.



3. Dissolve two spoons of common salt in half a cup of water. Now if you want to get the salt back, what will you do?

Ans. To get the salt back we can heat the solution so that water can evaporate leaving the crystals of salt back. This can also be done if the solution is kept in sun for few hours. The water will get evaporated and crystals of salt will be left behind.

4. Explain the process of rooftop rain water harvesting with the help of a suitable diagram.

Ans. Rainwater containing soil from the roof is collected from the rooftop and is collected into a storage tank, through pipes. Second step is to filter the stored water. The water can also be transported into a pit in the ground. This then seeps into the soil to recharge or refill the ground water.

TEXTUAL EXERCISE:

Question 1. Fill up the blanks in the following:

(a) The process of changing of water into its vapour is called ----------.
(b) The process of changing water vapour into water is called ----------.
(c) No rainfall for a year or more may lead to---------- in that region.
(d) Excessive rains may cause ---------.

Answer: (a) The process of changing of water into its vapour is called **evaporation**.
(b) The process of changing water vapour into water is called **condensation**.
(c) No rainfall for a year or more may lead to **drought** in that region.
(d) Excessive rains may cause **flood**.

Question 2. State for each of the following whether it is due to evaporation or condensation:

(a) Water drops appear on the outer surface of a glass containing cold water.
(b) Steam rising from wet clothes while they are ironed.
(c) Fog appearing on a cold winter morning.
(d) Blackboard dries up after wiping it.
(e) Steam rising from a hot girdle when water is sprinkled on it.

Answer: (a) Condensation.
(b) Evaporation
(c) Condensation
(d) Evaporation
(e) Evaporation

Question 3. Which of the following statements are "true"?
(a) Water vapour is present in air only during the monsoon.
(b) Water evaporates into air from oceans, rivers and lakes but not form the soil.

(c) The process of water changing into its vapour, is called evaporation.
(d) The evaporation of water takes place only in sunlight.
(e) Water vapour condenses to form tiny water droplets of water in the upper layers of air where it is cooler.

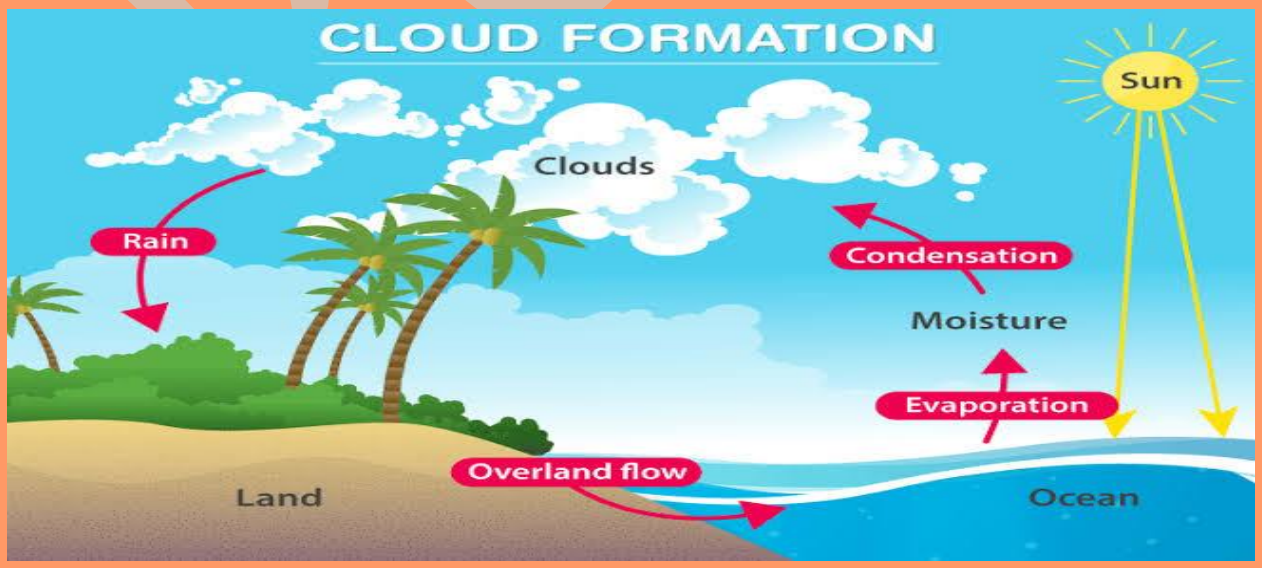
Answer: (a) False, (b) False, (c) True, (d) False, (e) True.

Question 4. Suppose you want to dry your school uniform quickly. Would spreading it near an anghiti or heater help? If yes, how?
Answer: Yes, spreading it near an anghiti or heater will surely help as heater and anghiti are source of heat which vaporize the water of the wet clothes and thus help in drying.

Question 5. Take out a cooled bottle of water from refrigerator and keep it on a table. After some time you notice a puddle of water around it. Why?
Answer: The puddle of water seen around the cooled bottle of water is due to the condensation effect as the water vapour present in the air around the bottle gets condensed after colliding with bottle.

Question 6. To clean their spectacles, people often breathe out on glasses to make them wet. Explain why the glasses become wet?
Answer: When we breathe out, water vapour also comes out with exhaled air. These water vapours when come in contact with the glasses of spectacle make them wet.

Question 7. How are clouds formed?
Answer: The process of condensation plays an important role in formation of cloud. As water vapour goes higher from the surface of the earth, it gets cooler. When the air moves up, it gets cooler and cooler. At sufficient heights the air becomes so cool that the water vapour present in it condenses to form tiny water droplets. It is these tiny droplets that remain floating in air and appear to us as clouds.



Question 8. When does a drought occur?
Answer: If it does not rain for one or two years, the soil continuous to lose water by evaporation and transpiration. Since, it is not being brought back by rain, the soil becomes dry. The level of water in ponds and wells of the region goes down and some of them may even dry up. The ground water may also become scare. This may lead to drought.