Chapter 1: Water — The Essence of Life

CONTENTS

14 exercises · 27 questions

1.1	Discuss — Ocean Water	2 Q
1.2	Activity 1 — Freshwater Sources (Identify from Images)	1 Q
1.3	Activity 2 — Water Has Different Forms	4 Q
1.4	Activity 3 — Water Cycle (Transparent Bag)	1 Q
1.5	Activity 4 — Groundwater (Soil Experiment)	1 Q
1.6	Activity 5 — Tick the Image for Groundwater Recharge	1 Q
1.7	Activity 6 — Mustard Seeds (How Rivers Flow)	3 Q
1.8	Discuss — Rivers Towards Arabian Sea and Bay of Bengal	1 Q
1.9	Activity 7 — Follow the Flow! (Rivers Map Table)	1 Q
1.10	Complete the Table — Animals on Land vs Animals in Water	1 Q
1.11	Activity 8 — Visit a Water Body (Observation Table)	2 Q
1.12	Activity 9 — Water on Paper and Wax Crayon	1 Q
1.13	Activity 10 — Who Eats Whom? (River Food Chain Game)	1 Q
1.14	Let Us Reflect — End-of-Chapter Questions	7 Q

Exercise 1.1 — Discuss — Ocean Water

Q1 Do you think we can drink the water present in the oceans?

SOLUTION

No, we cannot drink ocean water. Ocean water is salty (saline), and drinking it is harmful to humans.

All living beings need freshwater for drinking. Only a very small amount of Earth's water is freshwater, which comes from rivers, lakes, ponds, and groundwater.

Answer: No. Ocean water is salty and not fit for drinking. We need freshwater for drinking.

Q2 What can ocean water be used for?

SOLUTION

Even though ocean water cannot be drunk directly, it has several uses:

1. Salt is extracted from ocean water — the salt pans of Gujarat dry seawater to collect salt.
2. Ocean water supports marine life and fisheries.
3. It is used for navigation and sea transport.
4. With special treatment (desalination), ocean water can be converted to drinking water in some places.

Answer: Ocean water is used to extract salt, support marine life, and for sea transport. With desalination, it can be converted to drinking water.

Exercise 1.2 — Activity 1 — Freshwater Sources (Identify from Images)

Q1 Where can we find freshwater? Identify the different freshwater sources from the images given and write their names.

SOLUTION

The images around 'Sources of Water' show these freshwater sources:

1. Lake — a calm water body with green banks.
2. Glacier / ice cap — frozen freshwater (iceberg and snow-covered mountains).
3. Snow-capped mountains — snow is frozen freshwater that melts to feed rivers.
4. River — a river winding through green land.
5. Groundwater — drawn from the ground using a well / handpump.
6. Rain — rain clouds bring freshwater to Earth.

(One image shows the sea/ocean too, but that water is salty, not freshwater.)

Answer: The images show freshwater sources: a lake, a glacier/ice cap, snow-capped mountains, a river, groundwater (handpump), and rain.

Exercise 1.3 — Activity 2 — Water Has Different Forms

Q1 (a) A steel glass has ice cubes in it. Small water droplets form on the outside of the glass. Where do these water droplets come from?

SOLUTION

The air around us contains water vapour (invisible moisture).
The outside of the cold glass is much cooler than the surrounding air.
When the moist air touches the cold glass, it cools down and turns into tiny liquid water droplets.
This process is called condensation.

Answer: The droplets come from the water vapour in the air around the glass. When warm moist air touches the cold glass, it cools and condenses into water droplets.

Q2 (b) What happens to the ice cubes after they are left in the glass for some time?

SOLUTION

The ice cubes slowly absorb heat from the surroundings.
As they absorb heat, the ice melts and turns into liquid water.
This change from solid to liquid is called melting.

Answer: The ice cubes melt and turn into liquid water because they absorb heat from the surroundings.

Q3 (c) If we heat water, what will happen to it?

SOLUTION

When water is heated, it gains energy and its temperature rises.
At 100°C, water boils and turns into water vapour (steam).
This change from liquid to gas (vapour) is called evaporation or boiling.

Answer: When heated, water turns into water vapour (steam). This is called evaporation or boiling.

Q4 In the above activity, what forms of water do you see?

SOLUTION

The activity shows all three forms of water:
1. Solid — ice cubes in the glass.
2. Liquid — water formed when ice melts, and water droplets on the outside of the glass.
3. Gas (vapour) — water vapour in the air that condenses on the glass; and steam when water is heated.

Answer: All three forms: solid (ice), liquid (water/droplets), and gas (water vapour/steam).

Exercise 1.4 — Activity 3 — Water Cycle (Transparent Bag)

Q1 In the transparent bag activity (with coloured water placed in sunlight), what do you observe? Water heats up — how does it happen?

SOLUTION

Observation: After a few hours in sunlight, water droplets form on the inside of the bag near the top. The water level in the bag may appear slightly lower.

How water heats up: The sun provides heat energy. This heat warms the water in the bag, causing some of it to evaporate and turn into water vapour.

The water vapour rises, cools near the top of the bag, and condenses into tiny droplets on the inner surface.

This is a small model of the water cycle.

Answer: Water droplets form inside the bag near the top. Sunlight heats the water, causing evaporation; the vapour cools and condenses into droplets — just like the water cycle in nature.

Exercise 1.5 — Activity 4 — Groundwater (Soil Experiment)

Q1 When water is slowly poured into a glass half-filled with soil, what do you observe?

SOLUTION

Observation: The water slowly seeps down through the soil.

The soil absorbs some water, and the rest slowly passes through the gaps between soil particles and settles below.

This shows how rainwater seeps through layers of soil and rock to become groundwater.

Answer: The water seeps through the soil slowly. This shows how rainwater passes through soil layers to become groundwater stored underground.

Exercise 1.6 — Activity 5 — Tick the Image for Groundwater Recharge

Q1 Tick the image that will help in groundwater recharge. (Images shown: concrete road, green lawn/open area, paved area.)

SOLUTION

The green lawn or open uncovered area helps in groundwater recharge.
Open areas allow rainwater to seep into the ground through the soil.
Concrete roads and paved areas are hard surfaces that do not allow water to pass through, so rainwater runs off and groundwater does not get recharged.

Answer: The green lawn / open area. Open ground allows rainwater to seep into the soil and recharge groundwater. Concrete and paved surfaces block this.

Exercise 1.7 — Activity 6 — Mustard Seeds (How Rivers Flow)

Q1 What did you observe about the mustard seeds when poured on the highest point of the crumpled newspaper slope?

SOLUTION

The mustard seeds rolled and moved downward from the highest point.
They followed the slopes and folds of the crumpled newspaper.
This shows that water (like the seeds) always flows from higher ground to lower ground, following the shape of the land.

Answer: The mustard seeds rolled downward from the highest point, following the slopes — just like water flows from higher to lower ground.

Q2 Are the mustard seeds moving in a straight line, or do they spread out in different directions?

SOLUTION

The seeds do not move in a straight line.
They spread out in different directions depending on the folds and slopes of the crumpled newspaper.
Similarly, rivers do not always flow in a straight line — they curve and branch according to the shape of the land (mountains, valleys, plains).

Answer: They spread out in different directions, following the folds of the paper — just as rivers branch and curve based on the shape of the land.

Q3 Are the mustard seeds collecting in some areas? Do they gather like water gathers in lakes, rivers and so on?

SOLUTION

Yes, the seeds collect in the low-lying folds of the newspaper.
This is similar to how water collects in low-lying areas to form lakes, ponds, and rivers.
It shows that water always gathers where the land is lower.

Answer: Yes, seeds collect in the lower folds, just like water gathers in low areas to form lakes and rivers.

Exercise 1.8 — Discuss — Rivers Towards Arabian Sea and Bay of Bengal

Q1 Based on the mustard seeds activity, discuss how some rivers flow towards the Arabian Sea while some flow towards the Bay of Bengal.

SOLUTION

The mustard seeds activity showed that seeds (and water) always flow from higher ground to lower ground, spreading in the direction of the slope.

India has major mountain ranges like the Himalayas in the north and the Vindhya/Satpura ranges in central India.

Rivers on the eastern slopes (like Ganga, Godavari, Krishna, Mahanadi) flow eastward toward the lower land and empty into the Bay of Bengal.

Rivers on the western slopes (like Indus, Narmada, Tapti) flow westward and empty into the Arabian Sea.

The shape of the land and the direction of its slope determines which sea a river flows into.

Answer: The direction of slopes decides the flow. Rivers on eastern slopes flow toward the Bay of Bengal; rivers on western slopes flow toward the Arabian Sea — just as mustard seeds flow in the direction of the slope.

Exercise 1.9 — Activity 7 — Follow the Flow! (Rivers Map Table)

Q1 Observe the map of rivers in India and fill in the table: Which rivers move towards the Bay of Bengal, and which towards the Arabian Sea?

SOLUTION

The table in the book already names three rivers — Godavari, Narmada and Ganga. From the map:
- Godavari → moves towards the Bay of Bengal.
- Narmada → moves towards the Arabian Sea.
- Ganga → moves towards the Bay of Bengal.

The map also shows these rivers you can add:
Towards the Bay of Bengal: Yamuna, Brahmaputra, Krishna, Kaveri.
Towards the Arabian Sea: Tapti.

Answer: Bay of Bengal: Godavari, Ganga (also Yamuna, Brahmaputra, Krishna, Kaveri). Arabian Sea: Narmada (also Tapti).

Exercise 1.10 — Complete the Table — Animals on Land vs Animals in Water

Q1 Complete the following table by discussing with peers about the characteristics of animals on land and animals in water.

SOLUTION

Animals on Land vs Animals in Water:

Animals on Land:
- Cannot breathe in water (breathe air through lungs).
- Have legs or feet to walk or run on land.
- Have skin, fur, or scales that are suited for life on land.
- Body shape is suited for moving on hard surfaces.

Animals in Water:
- Have fins to swim.
- Can breathe in water (fish use gills to extract oxygen from water).
- Have streamlined body shape to move easily through water.
- May have webbed feet or flippers (e.g., turtles, fishing cats).

Some animals like frogs, fishing cats, and water snakes can live both on land and in water.

Answer: Land animals: breathe air, have legs, cannot breathe in water. Water animals: have fins, breathe using gills, have streamlined bodies. Some (like frogs) can live in both.

Exercise 1.11 — Activity 8 — Visit a Water Body (Observation Table)

Q1 Visit a local water body (pond, lake, or aquarium) with your teacher or parents. Observe the birds and animals and complete the observation table (name, mouth/beak, movement, legs/feet/fins, rough diagram).

SOLUTION

This is a hands-on field observation activity. Visit a local pond, lake, or aquarium with an adult. During your visit, observe different birds and animals. For your table, note:
- Fish: Round mouth facing upwards; moves using fins; no legs.
- Pond Heron: Long pointed beak; moves by wading or flying; thin legs.
- Frog: Wide mouth; jumps on land and swims in water; webbed hind legs.
- Dragonfly: Small mouthparts; flies; six legs.
- Turtle: Beak-like mouth; swims slowly; flippers or short legs.

Sketch a simple diagram of each animal you observe.
Your answers will vary depending on what you see at your local water body.

Answer: Hands-on visit activity. Observe and record the beak/mouth type, movement style, and leg/fin type of each animal you see. Answers will vary based on your local water body.

Q2 Draw the plants that you saw during the visit and label them with their local name.

SOLUTION

This is a drawing and observation activity based on your visit.
Guidance on types of plants to look for and record:
- Plants floating above water (e.g., Water Hyacinth — free-floating; Lotus / Water Lily — rooted, leaves float).
- Plants under water (e.g., aquatic weeds with roots in the mud).
- Plants whose roots are in the water bed but are seen above water (e.g., Reeds along the edge).

Draw and label each plant you observe, using its local name if you know it.
Your answers and drawings will vary based on your local area.

Answer: Hands-on drawing activity. Draw the plants observed at the water body and label with their local names. Look for floating plants (lotus, water hyacinth), underwater plants, and edge plants (reeds). Answers will vary.

Exercise 1.12 — Activity 9 — Water on Paper and Wax Crayon

Q1 Put a drop of water on plain paper. Observe. Then colour the paper with a wax crayon and put a drop of water on it. Do you observe any change? Write your observation.

SOLUTION

Observation on plain paper: The water drop soaks into the paper and spreads. The paper becomes wet and may wrinkle slightly.

Observation on wax-crayon coloured paper: The water drop does NOT soak in. It stays as a round bead on the surface and can be rolled off easily.

Reason: Wax is waterproof. The waxy layer repels water and prevents it from soaking into the surface.

Connection to plants: Many leaves have a natural waxy coating that works the same way — it keeps water from entering the leaf and damaging the plant. This is how aquatic plants like lotus keep their leaves dry even when floating on water.

Answer: On plain paper, the water soaks in. On wax-coloured paper, the water forms a round bead and does not soak in. Wax is waterproof and repels water — just like the waxy coat on leaves.

Exercise 1.13 — Activity 10 — Who Eats Whom? (River Food Chain Game)

Q1 In the River Food Chain Game, what would happen if one animal disappears — for example, if all the fish are gone?

SOLUTION

In a food chain, every living being is connected. If all the fish disappear:
- Animals that eat fish (like pond herons, otters, crocodiles, larger fish, and humans who fish) would lose a food source and their numbers would decrease.
- Smaller organisms that fish eat (like small water insects and larvae) would increase rapidly without fish to control them.
- This imbalance would affect the entire freshwater ecosystem.

This shows that every living being in a food chain is important. Removing even one can disturb the whole chain.

Answer: If all fish disappear, animals that eat fish (herons, otters, crocodiles) would struggle, and the small insects/organisms that fish eat would multiply uncontrolled. The whole food chain would be disturbed.

Exercise 1.14 — Let Us Reflect — End-of-Chapter Questions

Q1 Match the following:

(i) Ocean water
(ii) Snow
(iii) Steam
(iv) Rainwater

(a) Solid form of water
(b) Vapour form of water
(c) Not fit for drinking
(d) Freshwater

SOLUTION

(i) Ocean water — (c) Not fit for drinking
(ii) Snow — (a) Solid form of water
(iii) Steam — (b) Vapour form of water
(iv) Rainwater — (d) Freshwater

Answer: (i)→(c), (ii)→(a), (iii)→(b), (iv)→(d)

Q2 Why do you think most of the water on Earth cannot be used for drinking or farming?

SOLUTION

Most of the water on Earth (about 97%) is in the oceans and seas, which is salty (saline) water. Salty water is not fit for drinking or for watering crops — it can harm plants and is harmful if drunk by humans.

Of the remaining 3% freshwater, most is locked in glaciers and ice caps or stored deep underground.

Only a tiny fraction — found in rivers, lakes, and accessible groundwater — is easily available for drinking and farming.

The chapter uses the example: if all Earth's water filled a glass (200 ml), the freshwater available would only be as much as a teaspoon (5 ml)!

Answer: Most water (about 97%) is salty ocean water, which cannot be drunk or used to grow crops. Most of the remaining freshwater is frozen in glaciers. Only a very small amount is available as rivers, lakes, and groundwater.

Q3 A large number of living beings live near water bodies. Why?

SOLUTION

Living beings need water to survive. Water is essential for:

1. Drinking — all animals and plants need water to live.
2. Food — water bodies support fish, frogs, insects, and plants that animals feed on.

3. Shelter and breeding — many animals lay eggs near water (e.g., frogs, dragonflies).
4. Farming — humans settle near rivers and lakes to grow crops.
5. Transport and daily activities — humans use water for washing, cooking, and travel.

This is why civilisations have always grown near rivers and lakes.

Answer: All living beings need water for drinking, food, and survival. Water bodies provide food (fish, insects, plants), breeding grounds, and support for farming and daily activities. That is why most living beings live near water.

Q4 What would happen if it did not rain in your region for two years?

SOLUTION

If it did not rain for two years, the effects would be severe:

1. Rivers and ponds would shrink or dry up, reducing surface water.
2. Groundwater levels would fall because there is no rainwater to recharge the underground water.
3. Crops would fail due to lack of water for irrigation, leading to food shortage.
4. Drinking water would become scarce; people and animals would struggle to survive.
5. Trees and plants would die, affecting forests and wildlife.
6. The temperature might rise as there is less water to cool the air.

This is called drought, and it causes great hardship for people, animals, and plants.

Answer: Rivers and ponds would dry up, groundwater would fall, crops would fail, and there would be a shortage of drinking water. Animals and plants would die. This severe water shortage is called a drought.

Q5 What do you think happens to rainwater in a forest compared to a city?

SOLUTION

In a forest:

- The ground is covered with soil, leaves, and roots. Rainwater seeps slowly into the soil.
- Tree roots hold the soil and help water soak in, recharging groundwater.
- Less water runs off; rivers in forest areas flood less.
- The forest stays moist and supports many plants and animals.

In a city:

- Most surfaces are concrete roads, paved areas, and buildings. Water cannot seep into the ground.
- Rainwater flows off quickly into drains, leading to floods during heavy rain.
- Groundwater does not get recharged, so underground water levels fall.
- Cities often face both flooding (during rain) and water shortage (after rain) because the water is not stored.

Answer: In a forest, rainwater soaks into the soil, recharging groundwater and sustaining rivers slowly. In a city, concrete surfaces prevent water from seeping in — it runs off into drains, causing flooding but not recharging groundwater.

Q6 Can you design a house or school that conserves water wisely? What would it include?

SOLUTION

A water-wise house or school could include:

1. Rooftop rainwater harvesting — collect rainwater from the roof and store it in tanks for daily use.
2. Soak pits — allow excess rainwater to seep into the ground and recharge groundwater.
3. Low-flow taps and flushes — use less water without waste.
4. Greywater recycling — reuse water from washing and bathing to water plants.
5. Garden with native plants — native plants need less water than exotic ones.
6. Permeable (open) pathways — use gravel or grass paving instead of concrete so rain seeps into the soil.
7. Water meters — to track and reduce water use.

This is a creative design question; your design may differ — any water-saving idea is valid.

Answer: A water-wise design could include rainwater harvesting, soak pits, low-flow taps, greywater recycling, native plant gardens, and permeable paths. Any water-saving feature is a good answer — designs will vary.

Q7 Let us make a fish by folding a piece of paper (origami activity with 6 steps shown).

SOLUTION

This is a hands-on paper-folding (origami) activity.

Follow the 6 steps shown in the book to fold a piece of paper into the shape of a fish.

Guidance: Use a square piece of paper. Fold carefully following each step in order — the folds create the tail, body, and fins of the fish.

Once done, you can decorate your fish with colours or patterns.

Answer: Hands-on origami activity. Follow the 6 steps in the book to fold a square piece of paper into a fish shape. Decorate as you like.