2 Understanding the Weather

The Big Questions (Page 27)

1. **How can we measure and monitor the weather around us?**

   Ans. We can measure and monitor the weather using special instruments that help us observe different elements of weather:

   - Thermometer: Measures temperature.
   - Rain Gauge: Measures the amount of rainfall.
   - Barometer: Measures atmospheric pressure.
   - Hygrometer: Measures humidity.
   - Anemometer: Measures wind speed.
   - Wind Vane: Shows wind direction.

   These instruments are kept together at weather stations or automated weather stations (AWS) to record accurate and regular weather data. Scientists called meteorologists study this data to monitor and predict the weather.

2. **How do weather predictions help us prepare for events like heavy rain, storms, drought and heat waves?**

   Ans. Weather predictions are very useful because they:

   - Warn people in advance about extreme weather conditions.
   - Help farmers plan agricultural activities like sowing, harvesting, or protecting crops.
   - Support fishermen and sailors in avoiding dangerous sea conditions.
   - Help governments and disaster management teams prepare for natural disasters like cyclones or floods.
   - Allow schools, airports, and businesses to make safety decisions.
   - Protect life and property by giving people time to take necessary precautions.

   In short, weather forecasts help us stay safe and make better decisions in our daily lives.

LET'S EXPLORE (Page 28)

- **What are some of the words in your local language that you use to describe the weather?**

  Ans. Here are some words in my local language (Hindi) that we commonly use to describe the weather:

  - गर्मी (Garmi) – Hot
  - ठंडी (Thandi) – Cold
  - बारिश (Barish) – Rainy
  - नमी (Nami) – Humid
  - धूप (Dhoop) – Sunny
  - बर्फबारी (Barfbaari) – Snowfall
  - आंधी (Aandhi) – Stormy
  - कोहरा (Kohra) – Foggy
  - ओला-वृष्टि (Ola-Vrishti) – Hailstorm
  - उमस (Umas) – Sultry or sticky heat

  These words help us express how the weather feels around us in everyday conversation.

THINK ABOUT IT (Page 29)

- **Let us imagine that Krishnan from Chennai is speaking with Amir in Kashmir. Krishnan tells Amir that it has become chilly in Chennai after it rained the previous night. Amir asks him how cold it is. How will Krishnan explain to Amir how cold it is? After all, what is cold for Krishnan may be quite pleasant for Amir!**

  Ans. Krishnan can explain how cold it is in Chennai by telling the exact temperature using a common temperature scale, such as Celsius.

  For example, he can say,

  - "It is 20°C here this morning."
  - This helps Amir in Kashmir understand how cold it actually is, because what feels cold to Krishnan might feel mild or even warm to Amir, who is used to much colder temperatures.
  - By using a standard measurement like Celsius, people in different places can understand and compare weather conditions more clearly.

LET'S EXPLORE (Page 29)

- **What do you think could be some other reasons to measure the weather more precisely? (Hint: Think how knowing the weather a few hours or a few days in advance would help you plan some activities.)**

  Ans. Some other reasons to measure the weather more precisely are:

  - **Planning Outdoor Activities:** People can decide when to go for picnics, travel, or play outdoor games based on weather forecasts.
  - **Agriculture:** Farmers can plan sowing, irrigation, and harvesting of crops depending on rainfall and temperature predictions.
  - **Disaster Preparedness:** Accurate forecasts help in preparing for natural disasters like cyclones, floods, or heat waves, reducing loss of life and property.
  - **Transport and Travel:** Pilots, sailors, and drivers need weather updates to ensure safe travel and avoid delays.
  - **Health and Safety:** During extreme weather like heat waves or cold waves, people can take precautions to stay healthy.
  - **School and Event Planning:** Schools and organizers can decide whether to postpone or continue events based on the weather.

LET'S EXPLORE (Page 30)

- **Talk to elders in your neighbourhood and ask them how they predict the weather. What signs do they observe? Document any sayings in your regional language that refer to weather prediction.**

  Ans. I talked to some elders in my neighbourhood, and here's what they shared about how they predict the weather using natural signs:

  Signs they observe:

  - Ants moving in lines or carrying eggs – It usually means that rain is coming soon.
  - Frogs croaking loudly at night – This is taken as a sign of approaching rain.
  - Red or orange sky during sunset – It often means that the next day will be clear and sunny.
  - Clouds gathering near the horizon – This is seen as a signal of possible rain.
  - Sudden increase in humidity and sticky air – It indicates that it may rain in a few hours

Sayings in Hindi (regional language):

- "काली घटा छाए, पानी बरस आए।"
- (When dark clouds appear, rain will soon follow.)
- "चिड़ियों का उड़ना नीचा, बारिश का इशारा।"
- (When birds fly low, it's a sign of rain.)
- "मेंढ़क बोले रात भर, बारिश होगी ज़रूर।"
- (If frogs croak all night, it will definitely rain.)

These traditional methods are based on years of observation and are still used by many people, especially in villages.

LET'S EXPLORE (Page 32-33)

- **Here's a chart of the temperatures of a city in Madhya Pradesh. What is the maximum temperature recorded in the week shown here? What is the minimum? Calculate the range.**
  Ans.
  1. What is the maximum temperature recorded in the week?
     Ans. The maximum temperature recorded is 32°C on 03.03.2025.
  2. What is the minimum temperature recorded in the week?
     Ans. The minimum temperature recorded is 14°C on 05.03.2025.
  3. What is the range of temperature?
     Ans. Range = Maximum Temperature – Minimum Temperature
  4. Range = 32°C – 14°C = 18°C

  - Final Answer:
    - Maximum Temperature: 32°C
    - Minimum Temperature: 14°C
    - Range: 18°C

LET'S EXPLORE (Page 34)

- **Make a rain gauge as shown in the diagram above. Place the rain gauge in an open area, away from objects that might obstruct rain. Ensure that the rain gauge is on a flat surface and will not tilt or topple with the wind. Using the measuring scale, record the amount of rainwater collected at the same time every day, for a month. (If there is snow, allow it to melt before taking the measurement.) Calculate the average rainfall for every week in that month and comment on the variation from week to week.**
- **Ans.** Rain Gauge Activity (Sample Response)
  - **Step 1:** Making the Rain Gauge—I made a simple rain gauge using:
    - **i.** A clean plastic bottle (cut at the top and inverted like a funnel)
    - **ii.** A measuring scale marked in millimetres
    - **iii.** Some stones at the bottom to keep it stable
    - **iv.** Transparent tape to fix the measuring scale inside
  - **Step 2:** Placement
    - **i.** I placed the rain gauge in an open field away from trees and buildings.
    - **ii.** It was set on a flat surface, where it would not tip over due to wind.
  - **Step 3:** Daily Observation (example for 1 month)

I recorded rainfall at 8:00 AM every day for four weeks. Here's the weekly total:

Week	Total Rainfall (mm)	Average Rainfall (mm/day)
Week 1	35 mm	5 mm
Week 2	50 mm	7.14 mm
Week 3	10 mm	1.43 mm
Week 4	60 mm	8.57 mm

- **Step 4:** Weekly Variation Comments
  - **i.** Week 1: Moderate rainfall was observed.
  - **ii.** Week 2: Rain increased due to a weather change.
  - **iii.** Week 3: Very little rain, possibly a dry spell.
  - **iv.** Week 4: Highest rainfall — possibly due to a thunderstorm or active monsoon phase.
- **Conclusion**: This activity helped me understand how rainfall can vary from week to week and how useful regular observation is in identifying weather patterns.

THINK ABOUT IT (Page 35)

1. **Why do you think it would be important to measure atmospheric pressure?**

   Ans. Measuring atmospheric pressure is important because:
   - It helps in predicting weather conditions like storms, cyclones, or clear skies.
   - Sudden drops in pressure can signal the arrival of a storm or depression.
   - It helps in understanding changes in altitude and their effects on people.
   - It is useful for disaster preparedness, especially in coastal or hilly areas.
   - It supports scientific research on climate and weather systems.
2. **Who are the people most likely to use such measurements?**

   Ans. People who most likely use atmospheric pressure measurements include:
   - Meteorologists – to predict and study the weather.
   - Pilots and aviators – to ensure safe flight operations.
   - Mountaineers and trekkers – to monitor oxygen levels at high altitudes.
   - Fishermen and sailors – to avoid going to sea during low-pressure storms.
   - Army personnel – especially those posted in high-altitude areas.
   - Disaster management teams – to take timely action during storms or cyclones.

   These measurements help in ensuring safety and making informed decisions.

THINK ABOUT IT (Page 35)

- **People who journey to places at a high altitude are advised to make pauses on the way to allow the body to acclimatise. Our army personnel serve in high-altitude places like Khardung la in Ladakh, which is over 5600 metres above sea level. It is hard to imagine how they live and work in places where the oxygen level is so low —the atmospheric pressure there is generally about 650 millibars!**

  Ans. People who travel to high-altitude places are advised to take breaks on the way to allow their bodies to acclimatise or adjust to the lower oxygen levels.

As altitude increases, atmospheric pressure decreases, and the amount of oxygen in the air becomes less. This makes it harder for the body to breathe and function normally. If a person ascends too quickly without acclimatisation, they may suffer from altitude sickness, which can cause dizziness, headache, tiredness, and even serious health problems.

Our army personnel who serve in high-altitude areas like Khardung La in Ladakh (which is over 5600 metres above sea level) face these challenges daily. The atmospheric pressure there is around 650 millibars, much lower than the normal 1013 millibars at sea level. Despite this, they bravely perform their duties in extreme and harsh conditions, which is truly admirable.

THINK ABOUT IT (Page 36)

- **Have you seen seeds like these flying in the wind? What would happen to the seeds if there was no wind?**

  Ans. Yes, I have seen seeds like these flying in the wind. These are lightweight seeds with hair-like or wing-like structures that help them float in the air and travel long distances.

  If there was no wind:
  - The seeds would fall straight to the ground near the parent plant.
  - They would not spread far and wide.
  - This would lead to overcrowding of plants in one place.
  - The plants would have to compete for sunlight, water, and nutrients, which could affect their growth.
- **Conclusion**:

  Wind plays a very important role in seed dispersal, helping plants to grow in new places and maintain ecological balance.

LET'S EXPLORE (Page 37)

- **Where do you think humidity is likely to be more, Kochi or Jaipur? You might guess that Kochi has higher humidity than Jaipur because it is located near the sea. But how will we know for sure? If we had to compare the humidity level between Kochi and Mangaluru, how would we do it? Discuss with your classmates.**

  Ans. Humidity is likely to be more in Kochi than in Jaipur because:
  - Kochi is located on the coast, near the Arabian Sea, where there is a lot of moisture in the air.
  - Jaipur is located in Rajasthan, which is a dry and desert-like area with low moisture.

  To know for sure, we need to measure humidity using an instrument called a hygrometer. It tells us the relative humidity (in percentage) of the air.
- **To compare humidity between Kochi and Mangaluru:**
  - We would check the humidity readings from weather stations in both cities on the same day and time.
  - We can also check official weather websites like the India Meteorological Department (IMD) for accurate data.
  - By comparing the percentage of relative humidity, we can find out which place is more humid.

- **Example Discussion:** If Kochi shows 84% humidity and Mangaluru shows 78%, we can say Kochi is slightly more humid at that time. Regular measurement helps us understand weather patterns better.

THINK ABOUT IT (Page 38)

- **If the humidity in Delhi is at 52% while in Kochi it is 84%, in which of the two places are wet clothes likely to dry faster? And where are you likely to sweat more, assuming the temperature is the same in both places?**

  Ans.

  - **If the humidity in Delhi is 52% and in Kochi it is 84%, then:**
    - Wet clothes will dry faster in Delhi because lower humidity means the air can absorb more moisture from the clothes.
    - You are likely to sweat more in Kochi, and the sweat will not dry quickly, making you feel hot and sticky, because the air is already full of moisture.
  - **Conclusion**:
    - Lower humidity = faster drying and cooler feeling
    - Higher humidity = more sweating and uncomfortable feeling

  So, Delhi is more comfortable in this case, even if the temperature is the same in both places.

LET'S EXPLORE (Page 41)

- **Discuss, in pairs, different situations in which weather predictions are helpful. Make a list, and after you have completed it, share it and discuss it with the pair sitting next to you. How many different categories of situations have you been able to identify?**

  Ans. Here is a list of different situations where weather predictions are helpful:

  1. **Agriculture**
     - Farmers can plan sowing, irrigation, and harvesting based on rainfall predictions.
     - Helps protect crops from floods or droughts.
  2. **Travel and Transport**
     - Pilots and sailors use weather reports to ensure safe journeys.
     - Road travel can be planned by avoiding fog, storms, or heavy rain.
  3. **Disaster Preparedness**
     - Helps in early evacuation during cyclones, floods, or storms.
     - Disaster management teams can prepare relief material in advance.
  4. **Daily Life Planning**
     - People can carry umbrellas, wear proper clothing, or reschedule outdoor events.
  5. **School and Event Management**
     - Schools and organisers can postpone picnics, matches, or functions during bad weather.
  6. **Health and Safety**
     - People can protect themselves from heat waves, cold waves, or heavy pollution days.

  - **Categories Identified:**
    1. Agriculture
    2. Transport
    3. Disaster Management
    4. Personal Planning
    5. Educational/Outdoor Events
    6. Health and Safety

  Weather predictions are important in many areas of life, helping people make safe and smart decisions.

LET'S EXPLORE

1. **What do you observe happening on that day? What are the various weather conditions that the IMD is alerting people to?**

   Ans. On that day, the India Meteorological Department (IMD) is issuing alerts for various weather events across different regions. The conditions include:

   - Heat waves in some northern and central parts.
   - Heavy rain, especially in coastal and northeastern regions.
   - Thunderstorms, lightning, and strong winds in certain areas.
   - Dust storms, hailstorms, or ground frost in isolated zones.

2. **Which states have warning signs?**

   Ans. States with warning signs may include (as per the map shown in the textbook):

   - Rajasthan
   - Madhya Pradesh
   - Odisha
   - Tripura
   - Lakshadweep
   - Tamil Nadu
   - West Bengal

3. **Which parts of India are likely to be free from severe weather?**

   Ans.

   - Northwestern Himalayan regions (like Himachal and parts of Jammu & Kashmir)
   - Some central and interior regions like Chhattisgarh or parts of Karnataka
   - Punjab and Haryana (if not under any alert)

   These areas may be shown under the "No Warning" category (white zone on map).

4. **Which states are likely to face heat wave conditions?**

   Ans. Rajasthan, Madhya Pradesh, Odisha these states usually face high temperatures in summer and may be shown in orange/red zones for heat wave warnings.

5. **What are the causes for warning in Tripura and Lakshadweep?**

   Ans.

   - **Tripura:** Likely warning for heavy rain and thunderstorms due to moisture from the Bay of Bengal.
   - **Lakshadweep**: Likely warning for very heavy rainfall, thunderstorms, or strong winds, common in coastal and island regions during low-pressure systems.

Question And Activities (Page 42-43)

1. **Match the instrument with the weather element it measures**

Instrument used	Element of the Weather
(1) Hygrometer	(a) Precipitation
(2) Anemometer	(b) Atmospheric pressure
(3) Barometer	(c) Wind direction and speed
(4) Thermometer	(d) Humidity
(5) Rain gauge	(e) Temperature

Ans. **1. ⟶ (d)**
2. ⟶ (c)
3. ⟶ (b)
4. ⟶ (e)
5. ⟶ (a)

2. **Jyotsna is deciding what clothes to pack for her school trip to Mumbai in June. She looks at the weather forecast, which predicts 29°C and 84% humidity. What would be your advice to her?**
Ans. Jyotsna should pack light, loose-fitting cotton clothes that allow her skin to breathe. Since it will be hot and humid, she should avoid synthetic fabrics. She should also carry an umbrella or raincoat in case of rain and stay hydrated by drinking plenty of water.

3. **Imagine that a small group of students is setting up a rain gauge.**
Here are some options for the site.
    1. **The school vegetable garden.**
    2. **The terrace of the school building.**
    3. **Open ground with elevated platform.**
    4. **Compound wall of school.**
    5. **Verandah of the school laboratory.**

Discuss in your group and finalise the site. Write down the reasons for your decision.
Ans. Site selection for a rain gauge – Discuss and choose
Best site: Open ground with elevated platform
Reason:

- It is away from walls or trees that may block rainfall.
- Being elevated ensures the gauge does not collect splashes or runoff.
- It provides the most accurate measurement of rainfall.

4. **Below is a chart taken from IMD, Jammu and Kashmir.**
Looking at the data available, write a short script to report the weather conditions in different parts of Jammu and Kashmir on the date shown. (Hint: Cover the temperature range, maximum and minimum temperatures, humidity, precipitation, etc.)

DAILY WEATHER PARAMETERS
Jammu & Kashmir (EVENING)
DATE: 01-02-2024

Station	max temperature of date			min temperature of date			from 0830 to 1730 hrs (mm/cm)		24 hrs R/F ending 0830 of date (mm/cm)		relative humidity	
	ACT (°C)	NOR (°C)	DEP (°C)	ACT (°C)	NOR (°C)	DEP (°C)	R/F (mm)	S/N (cm)	R/F	S/N	0830 (%)	1730 (%)
SRINAGAR	6.5	8.9	–2.4	0.2	–0.7	0.9	TR	0.0	13.4	2.4	89	89
QAZIGUND	3.2	8.5	–5.3	–0.4	–2.1	1.7	11.8	10.0	36.2	22.0	97	90
PAHALGAM	1.1	5.6	–4.5	–4.1	–6.1	2.0	6.0	8.0	19.4	23.0	96	96
KUPWARA	5.1	8.5	–3.4	–0.7	–2.3	1.6	0.5	0.0	21.9	10.0	97	94
KUKERNAG	2.6	6.6	–4.0	–1.4	–2.4	1.0	12.0	8.0	35.2	30.0	96	97
GULMARG	–2.6	1.4	–4.0	–7.6	–7.6	0.0	8.2	6.35	35.2	35.0	76	100
MUZAFARABAD	8.5	–	–	5.6	–	–	–	–	25.8	–	93	–

Note: ACT means actual; NOR means normal; DEP is departure from normal; R/F is rainfall; S/N is snowfall; TR means trace amount.

Ans. Weather report script for Jammu & Kashmir (01-02-2024)

Sample Weather Report Script:

- "Good evening! Here's the weather update for Jammu and Kashmir on 1st February 2024.
- Most regions experienced cold conditions with sub-normal temperatures. Srinagar recorded a maximum of 6.5°C and a minimum of 0.2°C.
- Qazigund saw 11.8 mm of rainfall and 10 cm of snow, with temperatures much below normal.
- Pahalgam and Gulmarg were the coldest, with Pahalgam at a chilling -4.1°C minimum and Gulmarg at -7.6°C.
- Kupwara and Kukernag also received moderate snowfall. Relative humidity remained high throughout the day, ranging from 76% to 100%.
- Muzafarabad was relatively warmer with a maximum of 8.5°C.
- That's all for the weather. Stay warm and safe!"