English Medium
Second Edition · November 2026

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# TET-II

**FREE DEMO**

# Science

Life processes, materials and the physical world

- Detailed concepts and classroom examples
- Topic-linked practice with explained answers
- Selected earlier-examination questions

**BOOK 07 | Mathematics-Science Series**

Prepared by
**Ajay R Raval**
**M.Sc., M.Ed.**

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# Science

Gujarat TET-II · English Medium

Mathematics-Science Series · Book 07

Prepared by

**Ajay R Raval**

M.Sc., M.Ed.

**Examinations qualified**

TET-1 (2025) | TET-2 (2023) | TAT (2023)

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Science content: 25 marks. Standards 6–8 form the base, with difficulty and linkages through Standard 12. Science pedagogy, worth 10 marks in the Mathematics-Science subject section, is covered separately in Book 08. Syllabus basis: Gujarat Education Department resolution of 8 October 2025. Gujarat English-medium textbook editions checked on 16 November 2026.

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## Preface

Dear learner,

Science preparation begins with observing, questioning and explaining. A useful answer connects a structure with its function, an observation with evidence, or a numerical result with a relationship and compatible units. A familiar word alone may not explain the particular situation.

This second edition retains all 429 practice questions from the preceding revision and mixes in 154 further questions across the 42 chapters. Each of the 583 practice questions has four alternatives, a checked answer, an explanation and an English Study link to prior teaching. The 66 selected earlier-examination records also have explanations and Study links.

Read the linked paragraph, worked example, table row or diagram before attempting the related question. A link points to the teaching needed for the answer or method; it is not an instruction to memorise the answer alone. The added questions draw from different taught subtopics, including comparisons, observations and calculations.

The current Gujarat English-medium Standards 6–8 textbooks provide the base, including Curiosity for Standard 6. All 12 Standard 6 chapters, 13 Standard 7 chapters and 13 Standard 8 chapters were compared for concepts, examples, tables, activities and exercise skills; related content is combined within this guide's subject chapters. The chapters combine related concepts and keep appropriate higher-secondary connections, as allowed by the examination framework. Science pedagogy is treated separately in Book 08.

Chemical formulae distinguish atom counts, groups and coefficients. Balanced equations conserve atoms without changing valid formulae. Read diagram labels and arrow directions carefully: a schematic is a model, not a scale drawing or a complete account of every biological detail. All 40 illustrations from the revised source edition are retained, with eight additional original diagrams.

Attempt each question before reading its answer. Check what changes, what stays comparable, and what a conclusion does not establish. In numerical work, include units and examine whether the answer fits the stated conditions. In experiments, follow the supervised procedure and the actual design of the instrument.

**Ajay R Raval** | GUJTEST

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CHAPTER 1

# Scientific Enquiry, Evidence and Measurement

## Ask a testable question

- **Science** develops explanations of the natural world using observation, evidence, reasoning and tests. Curiosity begins a question; a scientific conclusion needs evidence that others can inspect. A surprising observation is a reason to investigate, not a reason to invent a cause.
- An **observation** records what is seen or measured. An **inference** interprets it. "The water level fell by 2 cm" is an observation; "evaporation caused the fall" is an inference requiring checks for leakage and other causes.
- A hypothesis is a proposed, testable explanation. A prediction states an expected result under specified conditions. Support from one test does not establish that every alternative explanation is impossible.

## Design a fair comparison

- Change the **independent variable** deliberately, measure the **dependent variable**, and keep other relevant conditions comparable. To investigate light and plant growth, use similar plants, soil, water, duration and temperature rather than changing several factors together.
- A control provides a comparison. Repeat observations and use more than one specimen where feasible. Record unexpected results as carefully as expected ones; deleting them can hide a faulty explanation.
- Distinguish a measurement from its unit. Write 12 cm, not merely 12. Use appropriate precision: a ruler with millimetre divisions does not justify reporting an unestimated length to six decimal places.

## Read evidence carefully

- A table should name quantities and units. A graph needs labelled axes and an appropriate scale. A rising graph shows an association; the design determines whether a causal claim is justified.

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- For repeated measurements, compare spread as well as an average. A consistently displaced scale may give precise but inaccurate readings. Calibration concerns agreement with an accepted reference, not simply neat writing.

| Term | Meaning |
|---|---|
| Observation | A directly recorded feature or measurement |
| Inference | An interpretation of evidence |
| Hypothesis | A proposed testable explanation |
| Control | A comparison condition in an investigation |

**Worked example: Which conclusion is supported?**

1. Two identical open cups hold equal water volumes. One is kept in a moving airstream; the other in still air. After equal times the first loses more water.
2. With temperature, exposed area and starting quantity controlled, the observation supports faster **evaporation with increased airflow**.
3. It does not prove that airflow is the only factor affecting evaporation. A covered cup would introduce an additional variable.

**Worked example: Use a difference reading**

1. An object begins at the 2.4 cm mark of a damaged ruler and ends at 9.1 cm.
2. Length = 9.1-2.4 = **6.7 cm**. A nonzero start is usable if both endpoint readings are taken accurately.

## From a daily puzzle to a defensible conclusion

- A wet cloth dries faster when spread out. Turn this observation into a testable question: does exposed surface area affect the rate of water loss? State the changed factor, the measured outcome and the conditions that must remain comparable.
- **A fair test** compares similar samples over the same interval. Repetition helps reveal random variation; checking the instrument helps detect a systematic error. Three identical readings from a wrongly calibrated balance do not establish accuracy.

- Use the right scale and unit: metre for length, kilogram for mass, second for time and kelvin for thermodynamic temperature. A derived quantity combines measurements; speed uses length/time and density uses mass/volume. An observation, its explanation and a prediction are different parts of reasoning.

| Feature | Explanation or example |
|---|---|
| Observation | The moist sample loses 8 g in 30 minutes |
| Question | Does greater exposed area increase the loss? |
| Prediction | The spread-out sample will lose more water |
| Test | Compare equal starting amounts at the same temperature and airflow |
| Conclusion | State what the measured difference supports and the limits of that comparison |

**Worked example: One changed factor is enough**

1. Two equal wet cloth samples are kept under the same fan for 20 minutes. One is folded; one is spread flat. Their losses are 3 g and 7 g.
2. The result supports faster evaporation from the larger exposed area in these conditions. It does not establish that colour or temperature caused the difference, because those were not the deliberately changed factors.

## Apply the scientific method to everyday problems

Scientific enquiry connects a question with a possible explanation, a test, recorded observations and a conclusion that can be revised. If a torch fails, an exhausted cell, a loose connection and a damaged bulb are alternative explanations. Change or test one part at a time; replacing every part together may restore light without identifying the cause.

A result that disagrees with a prediction is useful evidence. Check the method and measurement, consider another explanation and test again. Science is collaborative: other people should be able to understand the procedure and compare results. Observation, calculation, models and experiments all contribute; a repeated assertion without evidence does not become a scientific explanation.

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## Chapter practice

**1. A pupil records a temperature of 31°C. This is primarily an...**

**(A)** Untestable belief **(B)** Unmeasured opinion
**(C)** Universal law **(D)** Observation

**Answer: D. Observation.** A thermometer reading is measured evidence.

Study link: Ask a testable question (point 2), p. 1.

**2. In testing the effect of salt concentration on seed germination, what should be varied deliberately?**

**(A)** Seed species and salt together **(B)** Salt concentration
**(C)** The conclusion before testing **(D)** All conditions at once

**Answer: B. Salt concentration.** Changing one relevant variable makes the comparison interpretable.

Study link: Design a fair comparison (point 1), p. 1.

**3. An object extends from 1.9 cm to 7.4 cm on a damaged ruler. Its length is...**

**(A)** 9.3 cm **(B)** 1.9 cm
**(C)** 5.5 cm **(D)** 7.4 cm

**Answer: C. 5.5 cm.** Subtract the initial reading: 7.4 - 1.9 = 5.5 cm. The usable marks need not start at zero.

Study link: Worked example: Use a difference reading, p. 2.

**4. A repeated result is very similar each time but differs from the accepted value. It may be...**

**(A)** Accurate by definition
**(B)** Precise but inaccurate
**(C)** A quantity without a unit
**(D)** A proof that the reference is false

**Answer: B. Precise but inaccurate.** Small spread and closeness to a reference are different properties.

Study link: Read evidence carefully (point 2), p. 2.

**5. Which term matches this description: A directly recorded feature or measurement?**

**(A)** Control **(B)** Inference
**(C)** Observation **(D)** Hypothesis

**Answer: C. Observation.** Observation: A directly recorded feature or measurement.

Study link: Read evidence carefully: Observation, p. 2.

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*TET-II 2015 | Q126 | Translated study form | Short-answer form*

**3. At which angle between force and displacement is work greatest for fixed magnitudes?**

**Answer: 0°.** $W = Fs\cos\theta$; $\cos\theta$ has its maximum value 1 at 0°.

Study link: Energy and electrical calculations (point 2), p. 380.

*TET-II 2015 | Q129 | Translated study form | Short-answer form*

**4. Which device converts electrical energy into mechanical energy?**

**Answer: Electric motor.** A motor produces motion from electrical input; a generator performs the reverse main conversion.

Study link: Energy and electrical calculations (point 4), p. 380.

*TET-II 2015 | Q134 | Translated study form | Short-answer form*

**5. Five 40 W lamps operate for 10 hours. Find their electrical energy use.**

**Answer: 2 kWh.** Total power = 200 W = 0.2 kW; energy = $0.2 \times 10 = 2$ kWh.

Study link: Energy and electrical calculations (point 1), p. 380.

*TET-II 2017 | Q89 | Translated study form | Short-answer form*

**6. An object weighs 60 N on Earth. Approximately what is its weight on the Moon?**

**Answer: 10 N.** Lunar gravity is about one-sixth of Earth's; the object's mass does not become one-sixth.

Study link: Worked example: Separate mass and weight, p. 380.

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