CLASS 8 · SCIENCE

Keeping Time with the Skies

Sample paper · 15 questions · 22 marks

10 objective questions × 1 mark. Five written-response questions: 12 marks. Write your working where needed. Suggested time: 45 minutes. Answers and marking guidance follow the questions.

Original Evater practice material aligned with these school topics. Not an official NCERT paper or marking scheme. No automatic grading is implied.

Section A · Objective questions (10 marks)

1. The length of a day is based on which repeating motion?

A. Earth's rotation on its axis

B. Earth's revolution around the Sun

C. The Sun's movement around the galaxy

D. The Moon's revolution around Earth

2. We can see the Moon because:

A. it glows from volcanic heat

B. it is lit by Earth's city lights

C. it reflects sunlight towards us

D. it produces its own light

3. The phases of the Moon are caused by:

A. the Moon stopping its rotation

B. the changing relative positions of the Sun, Earth and Moon

C. clouds covering parts of the Moon

D. Earth's shadow falling on the Moon

4. One complete cycle of the Moon's phases, from full Moon to the next full Moon, takes about:

A. 7 days

B. 365 days

C. 29.5 days

D. 24 hours

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5. The length of a year is based on:

A. the daily rising of stars

B. the phases of the Moon

C. Earth's rotation on its axis

D. Earth's revolution around the Sun

6. Leap years are needed because:

A. the Moon is slowing down

B. calendars were invented on a leap day

C. a year is about 365 and a quarter days

D. a year is exactly 365 days

7. Luni-solar calendars add an extra (intercalary) month from time to time in order to:

A. make every year 13 months long

B. honour astronomers

C. keep lunar months aligned with the seasons

D. shorten the year

8. On a particular night the Moon is highest in the sky around midnight. Its phase is most likely:

A. full Moon

B. new Moon

C. waxing crescent

D. waning crescent

9. Ravi says, 'The Moon can only be seen at night.' His statement is:

A. false, because the Moon makes its own light in the day

B. true, because the Moon orbits only at night

C. true, because sunlight hides the Moon

D. false, because the Moon is often visible during the day too

10. Days, lunar months and solar years are useful natural measures of time because they are based on:

A. the orders of kings

B. lucky numbers

C. sky motions that repeat in a predictable way

D. weather records

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Section B · Written responses (12 marks)

Attempt all five. Use a separate sheet if you need more space. The marks for each question are shown.

11. Explain why the Moon shows phases. Make clear why Earth's shadow is not the cause of the regular phases. [2 marks]

12. A fictional lunar calendar uses 12 months of 29.5 days each. Calculate its year length and the difference from a 365.25-day solar year. Why might a calendar intended to follow both lunar months and seasons need an adjustment? [2 marks]

13. A toy Earth completes one rotation every 8 seconds and one circuit of its lamp-Sun every 96 seconds. How many toy days fit in one toy year? Which two different motions do your calculation and labels represent? [2 marks]

14. An observation log records a thin crescent, then a half-lit Moon, then a gibbous Moon on successively later evenings. Identify whether the visible illuminated fraction is increasing or decreasing, name this part of the cycle, and predict the next main phase if the trend continues. [3 marks]

15. In an approximate model, each year has 365.25 days. A calendar designer proposes 365-day years for three years, followed by one 366-day year. Compare the total calendar days with the model over four years. Explain what this corrects and why it is still an approximation. [3 marks]

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Answers & marking guidance

Use these after attempting the paper. Accept equivalent correct reasoning and sensible units. These are Evater model answers, not an official marking scheme.

Section A · 1 mark each

1. A — One rotation of Earth on its axis gives the cycle of day and night.

2. C — The Moon shines by reflecting sunlight; we see only the sunlit part facing us.

3. B — As the Moon orbits Earth, we see different portions of its sunlit half. Earth's shadow causes eclipses, not the regular phases.

4. C — The Moon's phase cycle is about 29.5 days, which is the basis of the month.

5. D — One revolution of Earth around the Sun takes about 365.25 days, defining the year.

6. C — The extra quarter day each year adds up, so an extra day is added roughly every four years.

7. C — Twelve lunar months fall about 11 days short of the solar year, so an intercalary month realigns festivals with seasons.

8. A — A full Moon is opposite the Sun, so it rises near sunset, is highest around midnight and sets near sunrise.

9. D — Depending on its phase, the Moon is above the horizon during many daytime hours and can often be seen in daylight.

10. C — Days, months and years follow the predictable, repeating motions of the Earth, Moon and Sun.

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Section B · Model answers

11. The Moon is lit by the Sun on one half. As it orbits Earth, we see different portions of that lit half, producing the cycle of phases. Earth's shadow falls on the Moon only during a lunar eclipse, which is occasional and brief, not the regular monthly cycle.

Marking: 1 mark for changing view of the sunlit half as the Moon orbits; 1 for distinguishing eclipses from the regular phases.

12. 12 x29.5 = 354 days. The difference is 365.25-354 = 11.25 days. Without adjustment, the lunar months shift relative to the seasons; occasional extra months can help a luni-solar calendar realign them. These are approximate model values.

Marking: 1 mark for 354 days and 11.25-day difference; 1 mark for the seasonal-alignment explanation.

13. 96/8 = 12 toy days per toy year. Rotation on the axis represents the day; the circuit around the lamp represents revolution around the Sun and the year. The toy rates are not the actual rates of Earth.

Marking: 1 mark for 12; 1 mark for correctly distinguishing rotation/day and revolution/year.

14. The visible illuminated fraction is increasing. This is the waxing part of the cycle. After waxing gibbous, the next main phase is full Moon. The Sun continues to illuminate about half the Moon; our view of that half changes.

Marking: 1 mark for increasing visible lit fraction; 1 mark for waxing; 1 mark for full Moon next.

15. The calendar has 3 x365+366 = 1461 days. The model has 4 x365.25 = 1461 days, so the totals match over four years. The extra day compensates for the accumulated quarter-days. A real solar year is not exactly 365.25 days, so real calendars need more detailed long-term rules.

Marking: 1 mark for 1461 calendar days; 1 mark for 1461 model days; 1 mark for explaining the quarter-day correction and approximate year length.

Topic references

NCERT Class 8 Science, Curiosity, Chapter 11: Keeping Time with the Skies.

https://ncert.nic.in/textbook/pdf/hecu111.pdf

Concept reference only. Questions and model answers are original Evater practice material, not an official NCERT paper.

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