

CLASS 8

SCIENCE

EXTRA QUESTIONS

Extra Questions for Class 8 Science Chapter 13: Our Home: Earth, A Unique Life Sustaining Planet

Original extra practice questions for Class 8 Science Chapter 13 (Our Home: Earth), going beyond the textbook exercise. Full explanations included.

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Q1 (Comparative reasoning). Venus is closer to being Earth's "twin" in size than Mars, yet Venus is far less habitable than Mars. What does this suggest about the factors that determine habitability?

Solution: This shows that **size and distance from the Sun alone don't determine habitability**. Venus has a runaway greenhouse effect from its extremely thick carbon-dioxide atmosphere, making its surface hot enough to melt lead ($\sim 465^{\circ}\text{C}$), despite being similar in size to Earth. Mars, though smaller and colder, has conditions (thin atmosphere, past evidence of water) that are comparatively closer to survivable. Atmosphere composition and thickness matter as much as, or more than, size and orbital distance.

Q2 (Magnetic field reasoning). Explain, step by step, how the loss of a planet's magnetic field could eventually lead to the loss of its atmosphere, using Mars as an example.

Solution: Step 1: Without a magnetic field, the solar wind (charged particles from the Sun) hits the upper atmosphere directly. Step 2: These particles gradually knock atmospheric gas molecules into space over long timescales. Step 3: With less atmosphere, pressure drops and the greenhouse effect weakens, so the planet cools further. Step 4: Any liquid water present becomes unstable and is lost (frozen or evaporated away). This is the process scientists believe stripped away most of Mars' original atmosphere billions of years ago.

Q3 (Assertion–Reason). Assertion (A): A planet with stronger gravity than Earth would automatically be more habitable. Reason (R): Stronger gravity always retains a thicker, more breathable atmosphere.

Solution: R is **partially true but incomplete** — stronger gravity does help retain a thicker atmosphere, but a much thicker atmosphere can trap excessive heat (like Venus), making conditions worse, not better. So A is **false**: more gravity alone doesn't guarantee more habitability; the right balance of atmosphere thickness and composition matters more. **A is false; R is only partly true.**

Q4 (Applied, plate tectonics). Explain one way plate tectonics indirectly helps keep Earth's climate stable over very long timescales.

Solution: Plate tectonics drives the **carbon cycle** over geological timescales: volcanic activity releases carbon dioxide into the atmosphere, while weathering of rocks and subduction (rock being pulled back into the Earth at plate boundaries) removes carbon dioxide and buries it. This slow cycle acts as a natural thermostat, preventing carbon dioxide levels (and hence temperature) from drifting too far in either direction over millions of years — a process Mars and Venus, which lack active plate tectonics, don't have.

Q5 (Classification/spot the error). A student says: "Biodiversity and geodiversity mean the same thing — both just describe how many different things exist in an area." Correct this statement.

Solution: Incorrect distinction. Biodiversity refers to the variety of living organisms (species, genes, ecosystems) in an area. **Geodiversity** refers to the variety of non-living geological features — landforms, rocks, minerals, soils (like mountains, valleys, deserts). They're related (geodiversity often supports biodiversity by creating varied habitats) but describe different things: one living, one non-living.

Q6 (Applied reasoning, ozone). Explain the chain of events that would occur for skin cancer rates to rise if the ozone layer thinned significantly.

Solution: Step 1: A thinner ozone layer absorbs less incoming ultraviolet (UV) radiation from the Sun. Step 2: More UV radiation reaches Earth's surface. Step 3: Increased UV exposure damages DNA in skin cells over time. Step 4: This DNA damage raises the risk of mutations that can lead to skin cancer, along with other effects like cataracts and harm to crops and marine plankton.

Q7 (Numeric/scale reasoning). Earth's average distance from the Sun is about 150 million km. Mars is

about 228 million km from the Sun on average — roughly how many times farther from the Sun is Mars compared to Earth (to one decimal place)?

Solution: $228 \div 150 = 1.5$ times farther from the Sun than Earth.

Q8 (Adaptation/sustainability reasoning). A coastal town is experiencing more frequent flooding due to rising sea levels. Suggest two adaptation strategies distinct from the drought-focused strategies discussed for villages in the textbook.

Solution: (1) **Building or restoring natural barriers** such as mangrove forests or wetlands, which absorb wave energy and reduce flood impact. (2) **Elevating or flood-proofing critical infrastructure** (roads, buildings, drainage systems) and establishing early-warning systems so residents can prepare or evacuate before major flooding events.

Q9 (Vegetative propagation, HOTS). Why might farmers prefer vegetative propagation over growing new plants from seeds for crops like sugarcane and potato?

Solution: Vegetative propagation produces **genetically identical copies** of the parent plant, so farmers get predictable, consistent crop quality and yield. It's also often **faster** than growing from seed (skipping the slower seed-germination stage), and it's necessary for crops like sugarcane that rarely produce viable seeds naturally.

Q10 (Synthesis). Combining the ideas of habitable zone, atmosphere, and magnetic field, explain in your own words why scientists consider Earth's habitability to be a "delicate balance" rather than guaranteed by any single factor.

Solution: Earth's ability to support life depends on **multiple interconnected factors working together**, not any one alone: being in the Sun's habitable zone allows liquid water temperatures, but that alone isn't enough (Mars is partly in this zone too); the atmosphere must be thick enough to retain heat and pressure but not so thick it overheats the planet (unlike Venus); and the magnetic field is needed to protect that atmosphere from being stripped away by solar wind over time. If any one of these factors were significantly different, the overall balance that makes life possible could break down — which is why habitability is described as delicate rather than automatic.