CLASS 8 SCIENCE EXTRA QUESTIONS

Extra Questions: Class 8 Science Chapter 1 Exploring the Investigative World of Science

Original HOTS-style extra practice questions for Class 8 Science Chapter 1 (Exploring the Investigative World of Science), applying the chapter's scientific-method ideas — variables, controlled experiments, observation vs. measurement — to fresh scenarios beyond the textbook's own puri example. Full explanations...

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Q1. A student wants to find out whether plants grow taller with more sunlight. She places two identical plants in different amounts of sunlight but also waters them with different amounts of water. Why is this a poorly designed investigation?
Solution: She is changing **two variables at once** (sunlight and water), so if the plants grow differently, she can't tell whether it was due to sunlight, water, or both. A well-designed investigation changes only **one variable at a time** (here, sunlight) while keeping everything else (water, soil, pot size, temperature) constant.

Q2 (Identify the variables). A student wants to know if adding sugar makes bread dough rise faster. List one variable she should change (the variable being tested) and two variables she should keep constant.
Solution: Variable to change: amount of sugar added to the dough. **Variables to keep constant:** type/amount of flour, amount of yeast, temperature of the room, and rising time (any two of these). Keeping these constant ensures any difference in rising is caused only by the sugar.

Q3 (Observation vs. measurement). Classify each of the following as an "observation" (noticing something qualitatively) or a "measurement" (recording a number): (i) "The water turned cloudy." (ii) "The temperature rose to 45°C." (iii) "The seed took 6 days to sprout." (iv) "The leaf looked wilted."
Solution: (i) Observation. (ii) Measurement. (iii) Measurement. (iv) Observation. (Measurements involve a number with a unit; observations describe a quality or change without necessarily quantifying it.)

Q4 (Assertion–Reason). Assertion (A): A good scientific investigation always ends with one final, permanent answer. Reason (R): Investigations often raise new questions as they're carried out.
Solution: R is **true** — as the chapter itself notes with the puri example, investigating often leads to new questions rather than closing the topic. A is **false** — science is an ongoing process, and even well-studied phenomena (like why a puri puffs unevenly) can remain incompletely understood. **A is false; R is true.**

Q5 (Design your own controlled test). You notice that paper airplanes made with thicker paper fly shorter distances. Design a simple controlled experiment to test whether paper thickness affects flight distance, naming the variable you'd change and at least two things you'd keep the same.
Solution: Variable to change: thickness of paper used. **Keep constant:** the paper airplane's fold design/shape, the launch angle and force used to throw it, and the location (same room, no wind). Measure the distance each plane travels for several thicknesses, changing only the paper thickness between trials.

Q6 (Spot the flaw). A student claims: "I tested if warm water dissolves sugar faster than cold water. I used a bigger cup with more water for the warm-water test." What's wrong with this test?
Solution: The amount of water differs between the two trials (bigger cup, more water for warm water), which is a **second, uncontrolled variable** besides temperature. A larger volume of water could affect dissolving time independent of temperature, so the comparison isn't fair. Both trials should use the **same amount of water** in the **same size container**, changing only the temperature.

Q7 (Applying the puri lesson to a new context). Just as pricking a puri stops it from puffing (by letting steam escape), suggest one everyday example where "blocking" or "releasing" something changes an outcome in a similar cause-and-effect way, and explain the underlying idea.
Solution: Example: piercing a balloon lets air escape, causing it to deflate instead of staying inflated (similar cause-and-effect logic to pricking a puri lets steam escape instead of building pressure). The

underlying idea in both cases: trapped gas builds pressure and causes expansion/inflation; creating an opening releases that gas and pressure, changing the outcome. This shows how understanding a mechanism (trapped gas → pressure → expansion) helps predict what will happen when you change one condition.

Q8 (Curiosity across scales). The chapter poses one question about a kitchen-scale event (the puri) and another about a galaxy-scale event (stars vs. grains of sand). Give one more example each of a “small-scale” and a “large-scale” question a young investigator could explore.
Solution: (Answers will vary; sample answers:) **Small-scale:** “Why does an ice cube melt faster in salty water than in plain water?” **Large-scale:** “Is the number of trees on Earth increasing or decreasing over time?” Both types of questions can be investigated using the same basic method: ask a question, identify variables, test systematically, and observe/measure results — scale doesn’t change the underlying process of investigation.

Q9 (Fresh vs. stored dough — extending the reasoning). The chapter leaves open whether puris puff better with fresh or stored dough. If you tested this and found stored dough puffed less consistently, what would be a reasonable next question to investigate (following the idea that investigations often lead to new questions)?
Solution: A reasonable follow-up: “Does the reduced puffing happen because stored dough loses moisture, or because it loses elasticity (springiness) over time?” This follow-up question isolates *why* storage affects puffing, turning one general observation into a more specific, testable hypothesis — exactly the kind of open-ended follow-up the chapter describes.

Q10 (Grade progression concept). According to the chapter’s framing, Grade 6 focuses on “why/how” wonder-questions, Grade 7 on how answers open new questions, and Grade 8 on designing experiments with controlled variables. Explain in your own words why this progression makes sense as a way to learn science.
Solution: Learning to do science works best step by step: first you need **curiosity** (Grade 6 — noticing the world and asking questions), then you need to understand that answers aren’t final and often lead somewhere new (Grade 7 — building comfort with open-ended inquiry), and only then are you ready to learn the more structured, technical skill of **designing a fair test** with controlled variables (Grade 8). Trying to teach controlled experiments before building curiosity and comfort with open questions would make science feel like a rigid checklist rather than a way of exploring the world.