ALPHALEARN STUDYLAB

STD 8

SCIENCE

Curiosity — Publication-Grade Practice Worksheets

Foundation • Practice • Mastery

Based on CBSE / NCERT Curriculum | Answer Keys Included

STD 8 — SCIENCE

Publication-Grade Practice Worksheets | AlphaLearn Studylab

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CHAPTER 1

Exploring the Investigative World of Science

Foundation • Practice • Mastery • Answer Key

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Class 8 Science — Chapter 1: Exploring the Investigative World of Science

Worksheet 1 — Foundation

Building the basics of scientific investigation

Maximum Marks: 30 Time: 60 minutes

Name: _____ Date: _____ Section: _____

Section A — Multiple Choice Questions [5 × 1 = 5]

1. According to the chapter, scientific investigation always begins with: *[1]*

(a) a fancy laboratory
(b) a question born out of curiosity
(c) a textbook definition
(d) a calculator

2. In the puri-frying example, which of the following is something the investigator can control? *[1]*

(a) the colour of the kitchen walls
(b) the thickness of the rolled dough
(c) the mood of the cook
(d) the brand of the frying pan

3. An observation that only has a yes/no answer, such as 'Did the puri puff up?', is called a: *[1]*

(a) quantitative observation
(b) qualitative observation
(c) controlled observation
(d) accidental observation

4. While investigating the puri experiment, it is best to change: *[1]*

(a) all variables together for faster results
(b) only one variable at a time, keeping others the same
(c) no variable at all
(d) the variable that seems least important

5. The chapter states that in Grade 7 students learnt that science is: *[1]*

(a) a fixed set of unchanging facts
(b) always evolving, with each answer opening new questions
(c) only useful in laboratories
(d) the same as mathematics

Section B — Fill in the Blanks [5 × 1 = 5]

1. Investigation in science involves observing carefully, experimenting thoughtfully, and _____ clearly what we see. *[1]*

2. On the pages of the Class 8 Curiosity textbook, the _____ symbolises a solid foundation of knowledge, while the _____ symbolises curiosity taking flight. (two words) *[1]*

3. An observation that involves measuring a number, such as time in seconds, is called a _____ observation. *[1]*

4. Keeping _____ of everything seen and sensed during an experiment, such as smell or smoke, is good scientific practice. *[1]*

5. Even a simple everyday event like the puffing of a puri is not yet completely _____ by scientists. *[1]*

Section C — Short Answer Questions [5 × 2 = 10]

1. What is the difference between a variable that we control and a variable that we observe? Give one example of each from the puri-frying investigation. *[2]*

2. Why does the chapter recommend changing only one variable at a time during an experiment? *[2]*

3. State two different ways in which the puffing of a puri can be observed or measured. *[2]*

4. Explain, in your own words, why a kitchen can be considered a good place to do scientific investigation. *[2]*

5. What does the chapter mean by the statement 'science is always evolving'? *[2]*

Section D — Long Answer Questions [2 × 5 = 10]

1. A puri sometimes puffs up more on one side than the other. Design a simple investigation to find out whether the temperature of the oil affects how well a puri puffs up. In your answer, mention: (a) the question you are investigating, (b) the variable you will change, (c) at least two variables you will keep constant, and (d) what you will observe or measure. *[5]*

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2. Describe, with the help of the puri example, how scientists carry out a systematic investigation — from asking a question to recording observations. Why is this process useful even for solving everyday problems? *[5]*

Worksheet 1 — Foundation: Detailed Answer Key

Section A — Multiple Choice Questions [5 Marks]

1. **Correct option: (b)** — Scientific investigation starts with a curious question such as 'Why?' or 'How?', as illustrated by the 'Probe and Ponder' questions in the chapter.

2. **Correct option: (b)** — Dough thickness is something the investigator can deliberately change; the kitchen colour, mood, and pan brand are irrelevant or uncontrolled factors.

3. **Correct option: (b)** — A yes/no observation, with no numerical measurement, is a qualitative observation.

4. **Correct option: (b)** — Changing one variable at a time while keeping others constant ensures a fair test, so that any difference in the result can be linked to that one variable.

5. **Correct option: (b)** — The chapter recalls that in Grade 7 students learnt that each answer in science opens new questions, and ideas change as we explore deeper.

Section B — Fill in the Blanks [5 Marks]

1. **explain**

2. **root; kite**

3. **quantitative**

4. **notes / records**

5. **understood**

Section C — Short Answer Questions (2 marks each) [10 Marks]

1. A controlled variable is one we deliberately change or set, e.g., the thickness of the rolled dough or the temperature of the oil. An observed variable is one we watch or measure to see the effect of our change, e.g., whether the puri puffs up (yes/no) or the time it takes to puff (seconds). (1 mark for correct distinction + 1 mark for correct examples)

Keywords: *controlled variable, observed variable, dough thickness, oil temperature, puffing time*

2. Changing only one variable at a time, while keeping all other conditions the same, ensures that any change in the result can be confidently linked to that one variable. If several things are changed together, it becomes impossible to know which change caused the effect. This is the idea of a fair test.

Keywords: *fair test, one variable at a time, reliable conclusion*

3. (i) Checking whether the puri puffs up at all — a yes/no (qualitative) observation. (ii) Measuring the time taken (in seconds) for the puri to puff up — a quantitative observation. (Any two correct methods; checking whether a thick dough layer still gives a thin side is also acceptable.)

Keywords: *qualitative, quantitative, time in seconds, puffs up yes/no*

4. The kitchen contains everyday materials, heat, dough, and oil, allowing simple, safe experiments and observations to be made without needing special laboratory equipment. Science does not require a fancy laboratory — curiosity and careful observation are enough to begin investigating.

Keywords: *everyday observation, no laboratory needed, curiosity*

5. It means that scientific understanding is never final. As we investigate further, our answers to questions lead to new questions, and our ideas are refined or changed based on new evidence and observations, just as understanding has grown from Grade 6 to Grade 8.

Keywords: *evolving knowledge, new questions, ideas change with evidence*

Section D — Long Answer Questions (5 marks each) [10 Marks]

1. Model answer: (a) Question: Does the temperature of the oil affect how well a puri puffs up? (b) Variable changed: temperature of the oil (e.g., boiling hot, hot, and not very hot). (c) Variables kept constant: thickness and size of the rolled dough, type of flour used, and the way the dough is dropped into the oil (e.g., always slid in gently at the same angle). (d) What is observed/measured: whether the puri puffs up (yes/no) and/or the time taken to puff up (seconds); results can be recorded in a simple table for the three oil temperatures and compared. (1 mark for question, 1 mark for changed variable, 2 marks for constant variables, 1 mark for observation/measurement method)

Keywords: *hypothesis, controlled variable, constant variables, fair test, data table*

2. Model answer: Systematic investigation begins by asking a focused scientific question (e.g., why is one side of a puri thinner?). The investigator then identifies what can be changed/controlled (dough thickness, flour type, oil temperature, dropping method) and what can be observed or measured (puffing yes/no, time to puff). Only one variable is changed at a time while others are kept the same, to ensure a fair test. Careful notes are kept of everything observed, including unexpected details like splattering or smoke. The observations are then used to draw a conclusion and often lead to new questions (e.g., does fresh dough puff better than stored dough?). This process is useful for everyday problems because it turns casual curiosity into a reliable method for finding real answers, whether the problem is about cooking, health, or the environment. (Award marks for correctly sequencing the steps, use of the puri example, and explanation of usefulness.)

Keywords: *systematic investigation, question, variables, fair test, observation, conclusion, new questions*

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Class 8 Science — Chapter 1: Exploring the Investigative World of Science

Worksheet 2 — Practice

Applying the ideas of investigation and fair testing

Maximum Marks: 30 Time: 60 minutes

Name: _____ Date: _____ Section: _____

Section A — Multiple Choice Questions [5 × 1 = 5]

1. A student is testing whether dough thickness affects puri puffing. Which of these must be kept the SAME across all trials for it to be a fair test? *[1]*

(a) the thickness of the dough
(b) the temperature of the oil
(c) the number of puris fried
(d) the time of the day

2. Which of the following is a quantitative observation? *[1]*

(a) The puri puffed up nicely.
(b) The oil smelled strongly.
(c) The puri took 12 seconds to puff up.
(d) The dough looked soft.

3. Which of these is NOT something an investigator can realistically control while frying a puri at home? *[1]*

(a) the type of flour used
(b) the size of the rolled dough
(c) the exact humidity of the entire city that day
(d) the angle at which the dough is dropped into the oil

4. Two students fry puris using different flours AND different oil temperatures at the same time, then compare results. Their test is unfair mainly because: *[1]*

(a) they used a kitchen instead of a laboratory
(b) more than one variable was changed at the same time
(c) they did not use a thermometer
(d) puris cannot be studied scientifically

5. The chapter suggests that after one round of experiments, an investigator should: *[1]*

(a) stop, since the investigation is complete
(b) think of further questions raised by the observations
(c) avoid recording anything further
(d) repeat the exact same question with no new thinking

Section B — Fill in the Blanks [5 × 1 = 5]

1. When only the variable being tested is changed and all other conditions are kept the same, the experiment is called a _____ test. *[1]*

2. Noting down details such as splattering, smell, or smoke during an experiment, even if not the main focus, helps because these details may turn out to be _____ later. *[1]*

3. A conclusion drawn from just one trial is less reliable than one drawn after _____ the experiment several times. *[1]*

4. The variable that an investigator deliberately changes in an experiment is often called the _____ variable. *[1]*

5. Investigating everyday events like puri puffing shows that science is _____ , meaning it is present in ordinary life and not only in laboratories. *[1]*

Section C — Short Answer Questions [5 × 2 = 10]

1. Two students fry puris using different types of oil, while keeping everything else the same, to see which oil gives better puffing. Is this a fair test? Give a reason for your answer. *[2]*

2. Suggest one everyday question, other than the puri example, that could be investigated the way described in this chapter. Briefly state what could be changed and what could be observed. *[2]*

3. Why might a scientist record details like whether the oil splattered or smoked, even though the main observation is about puffing? *[2]*

4. Suggest one way to make the puri investigation more reliable, other than changing only one variable at a time. *[2]*

5. Explain, with an example, the difference between something we 'control' in an experiment and something we 'observe'. *[2]*

Section D — Long Answer Questions [2 × 5 = 10]

1. A student wants to find out whether pricking a small hole in the rolled dough before frying affects how much a puri puffs up. Design a complete investigation: state the question, the variable changed, at least two variables kept constant, and how the results will be observed and recorded. *[5]*

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2. Study the data below, collected by a student frying puris of the same dough thickness at three different oil temperatures, and answer the questions that follow. Oil Temperature: Not very hot → Puffed up: No → Time taken: Did not puff Oil Temperature: Hot → Puffed up: Yes → Time taken: 18 seconds Oil Temperature: Boiling hot → Puffed up: Yes → Time taken: 9 seconds (a) What pattern do you notice between oil temperature and puffing time? (2) (b) Was this a fair test? Justify your answer. (1) (c) Suggest one further question this data might raise for investigation. (2) *[5]*

Worksheet 2 — Practice: Detailed Answer Key

Section A — Multiple Choice Questions [5 Marks]

1. **Correct option: (b)** — If dough thickness is the variable being tested, oil temperature must be held constant across trials for the comparison to be fair.

2. **Correct option: (c)** — A measured number (12 seconds) is a quantitative observation; the other options describe qualities, not measurements.

3. **Correct option: (c)** — City-wide humidity is an external factor beyond the investigator's control; flour type, dough size, and dropping angle can all be set deliberately.

4. **Correct option: (b)** — Changing flour and oil temperature together means any difference in puffing cannot be linked to a single cause — this breaks the fair test principle.

5. **Correct option: (b)** — The chapter notes that after one round of experiments, investigators often think of further questions, such as whether fresh or stored dough puffs better.

Section B — Fill in the Blanks [5 Marks]

1. **fair**

2. **useful / important / significant**

3. **repeating**

4. **controlled / changed**

5. **everywhere**

Section C — Short Answer Questions (2 marks each) [10 Marks]

1. No, it is a fair test only if oil type is the single variable being changed while everything else (dough thickness, oil temperature, dropping method) is kept the same — which the question states is true. So this IS a fair test, since only one variable (oil type) differs between the trials. (1 mark for correct judgement + 1 mark for reasoning based on 'one variable changed at a time')

Keywords: *fair test, one variable changed, oil type*

2. Any reasonable everyday question is acceptable, e.g.: 'Does the amount of water added to atta affect how soft a phulka becomes?' — variable changed: amount of water; observation: softness/texture of the phulka, or whether it puffs on the flame. (Accept other valid everyday examples with a clear changed variable and observation.)

Keywords: *everyday question, changed variable, observation*

3. Unexpected details recorded during an experiment, even if not the main focus, can later turn out to be important clues — for example, smoke might indicate the oil was overheated, which could itself explain a change in puffing. Careful, complete notes help investigators notice patterns they might otherwise miss.

Keywords: *unexpected observations, complete notes, hidden clues*

4. Repeating the experiment several times (multiple trials) for each condition makes the investigation more reliable, since a single trial could be affected by chance. Averaging results across trials gives a more trustworthy conclusion. (Accept: using more precise measuring tools, such as a timer, as an alternative valid answer.)

Keywords: *repeat trials, reliability, averaging results*

5. What we 'control' is a variable we deliberately choose and set before the experiment, such as the temperature of the oil. What we 'observe' is the result we watch for or measure after the experiment, such as whether the puri puffs up or how long it takes. For example, the investigator controls dough thickness but observes puffing time.

Keywords: *control vs observe, independent and dependent factors, example*

Section D — Long Answer Questions [10 Marks]

1. Model answer: Question: Does pricking a hole in the rolled dough affect how much a puri puffs up? Variable changed: presence or absence of a pricked hole in the dough. Variables kept constant: dough thickness and size, type of flour, oil temperature, and the way the dough is dropped into the oil. Observation/recording: for each trial (with hole vs without hole), note whether the puri puffs up (yes/no) and measure the time taken to puff (seconds); repeat each condition a few times and record results in a simple comparison table. (1 mark question, 1 mark changed variable, 2 marks constant variables, 1 mark observation method)

Keywords: *hypothesis, single changed variable, constants, data table, repeated trials*

2. (a) As oil temperature increases, the puri is more likely to puff up, and the time taken to puff decreases — the puri did not puff at all in not-very-hot oil, took 18 seconds in hot oil, and only 9 seconds in boiling hot oil. (2 marks) (b) Yes, it was a fair test, since only the oil temperature was changed while dough thickness was kept the same across all three trials. (1 mark) (c) Any reasonable follow-up question is acceptable, e.g., 'Does oil temperature beyond boiling hot cause the puri to burn instead of puff better?' or 'Does this same pattern hold for different types of flour?' (2 marks)

Keywords: *pattern/trend, fair test justification, follow-up question*

Class 8 Science — Chapter 1: Exploring the Investigative World of Science

Worksheet 3 — Mastery

Competency-based, case-based, and HOTS questions

Maximum Marks: 30 Time: 60 minutes

Name: _____ Date: _____ Section: _____

Section A — Multiple Choice Questions [5 × 1 = 5]

1. A student changes both the dough thickness and the oil temperature in the same trial and observes better puffing. What is the main flaw in this investigation? *[1]*

(a) The result cannot be tested by observation.
(b) It is impossible to tell whether the thickness or the temperature (or both) caused the improved puffing.
(c) Dough thickness cannot be measured.
(d) Oil temperature is not a real variable.

2. A group records only whether the puri puffed (yes/no) but not how long it took. What kind of data are they missing? *[1]*

(a) qualitative data
(b) quantitative data
(c) unfair data
(d) irrelevant data

3. Which statement best reflects the chapter's view on scientific knowledge? *[1]*

(a) Once a phenomenon is studied, it becomes fully and permanently understood.
(b) Even everyday, well-known phenomena like puri puffing may not be completely understood by scientists.
(c) Only phenomena studied in a laboratory can be called scientific.
(d) Investigation is only useful for major global problems, not everyday events.

4. A student wants to compare puffing between fresh dough and dough stored overnight. To keep the test fair, which of these should also be kept the same in both cases? *[1]*

(a) the day of the week
(b) the thickness of the dough and the oil temperature
(c) the name of the cook
(d) nothing needs to be kept the same

5. Which of these best describes why keeping notes of 'extra' observations (like smell or smoke) reflects good scientific thinking, according to the chapter? *[1]*

(a) It fills up space in a notebook.
(b) It ensures the experiment takes longer.
(c) Unplanned observations can later provide useful clues or raise new questions.
(d) It is required only for chemistry experiments.

Section B — Fill in the Blanks [5 × 1 = 5]

1. When more than one variable is changed at the same time, the results of an experiment become _____ to interpret with confidence. *[1]*

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2. A scientific investigation that changes one variable while holding all others constant, in order to isolate cause and effect, reflects the principle of a _____ test. *[1]*

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3. The chapter's example of the _____ , observed at night, later helped humans design early calendars by combining it with sunrise and sunset observations. *[1]*

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4. Because science keeps evolving, investigators should treat their conclusions as open to _____ when new evidence appears. *[1]*

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5. The heating effect and the _____ effect of electric current are two examples the chapter mentions of how electricity helps in everyday life. *[1]*

Section C — Short Answer Questions (HOTS) [5 × 2 = 10]

1. A student claims: 'My puri puffed up better today, so hotter oil always makes puris puff better.' Identify one flaw in this reasoning based on what you have learnt about fair testing. *[2]*

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2. Explain how the same basic method used to investigate puri puffing (asking a question, controlling variables, observing results) could, in principle, be used to investigate a much bigger question, such as whether the Earth's climate is changing. *[2]*

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3. A student wants to investigate whether the size of the rolled dough affects puffing but only tries it once with a large piece and once with a small piece, using different oils each time. Identify two problems with this investigation. *[2]*

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4. Why does the chapter describe investigators as both 'learners' and 'investigators' or 'young scientists'? What is the difference it is highlighting? *[2]*

5. Give one reason why repeating an experiment multiple times gives a more trustworthy conclusion than doing it only once. *[2]*

Section D — Long Answer Questions (Case-Based) [2 × 5 = 10]

1. Case Study: A student, Meher, wants to find out whether the type of flour (atta vs maida) affects how much a phulka swells on a flame. She rolls two doughs of the same thickness and size, one from atta and one from maida, and places both directly on the same flame for the same duration, one after another. She records whether each swells up and how long it takes. (a) Identify the variable being changed and the variable(s) being observed. (2) (b) Is this a fair test? Explain why or why not. (2) (c) Suggest one additional variable she should keep constant to strengthen her investigation. (1) *[5]*

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2. The chapter compares investigating the puffing of a puri to investigating bigger questions like 'Is the world getting warmer?' Explain, in your own words, how the core steps of scientific investigation (question → identifying variables → observing/measuring → recording → drawing conclusions → raising new questions) apply to both a simple kitchen experiment and a large-scale scientific study, and why this common method makes science a reliable way of understanding the world. *[5]*

Worksheet 3 — Mastery: Detailed Answer Key

Section A — Multiple Choice Questions [5 Marks]

1. Correct option: (b) — Changing two variables together makes it impossible to attribute the improved puffing to either factor alone — this violates the one-variable-at-a-time principle.

2. Correct option: (b) — Time taken (a number) is quantitative data; recording only yes/no gives qualitative data but omits the quantitative measurement.

3. Correct option: (b) — The chapter explicitly notes that even the everyday puffing of a puri is not completely understood by scientists today, showing that familiarity does not mean full understanding.

4. Correct option: (b) — To fairly compare fresh vs stored dough, all other variables — dough thickness and oil temperature — must be kept identical between the two trials.

5. Correct option: (c) — Recording unplanned details, such as smell or smoke, can later provide clues that help explain results or suggest new questions to investigate.

Section B — Fill in the Blanks [5 Marks]

1. difficult / impossible / unreliable

2. fair

3. Moon (phases of the Moon)

4. revision / change

5. magnetic

Section C — Short Answer Questions (HOTS, 2 marks each) [10 Marks]

1. The student is generalising from a single trial without knowing whether any other variable also changed that day (e.g., dough thickness, flour freshness, or dropping method). A single result cannot confirm a general rule; the experiment must be repeated with only oil temperature changed, and other conditions kept constant, before such a conclusion can be trusted.

Keywords: *single trial, unfair generalisation, repeat with controlled variables*

2. In both cases, an investigator starts with a focused question, identifies what can be measured or observed (such as temperature or puffing), decides what needs to be kept constant or accounted for, collects data over time or across trials, and uses the observations to draw conclusions — which may raise further questions. For climate, this might mean tracking temperature data over years while accounting for other factors, just as the puri experiment tracks puffing while controlling dough thickness and oil temperature. The scale is different, but the logical process of investigation is the same.

Keywords: *same method at different scales, data collection, controlled comparison*

3. (i) The dough size was only tested once each (not repeated), so results could be due to chance rather than a real pattern. (ii) Using different oils for the two trials means more than one variable changed at once, so it is not a fair test — any difference in puffing cannot be confidently linked to dough size alone.

Keywords: *single trial problem, more than one variable changed, unfair test*

4. The chapter highlights that investigators are not only 'learners' who absorb existing facts, but also active 'investigators' or 'young scientists' who ask their own questions, design ways to test them, and build new understanding through observation — the difference between passively receiving knowledge and actively creating it.

Keywords: *active vs passive learning, generating new understanding*

5. Repeating an experiment several times helps rule out results caused by chance or by small, unnoticed differences between trials, so a pattern that appears consistently across repeated trials is more likely to reflect a real effect rather than a one-off coincidence.

Keywords: *reduces chance error, consistent pattern, reliability*

Section D — Long Answer Questions (Case-Based, 5 marks each) [10 Marks]

1. (a) Variable changed: type of flour (atta vs maida). Variable(s) observed: whether the phulka swells up (yes/no) and the time taken to swell. (2 marks) (b) Yes, it is a fair test, because dough thickness, dough size, the flame, and the duration on the flame were all kept the same for both trials — only the flour type differed. (2 marks) (c) Any reasonable additional constant is acceptable, e.g., the amount of water used to knead each dough, the resting time before cooking, or the exact distance of the dough from the flame. (1 mark)

Keywords: *changed variable, observed variable, fair test justification, additional constant*

2. Model answer: Both investigations begin with a focused question (why does one side of a puri puff thinner? / is the world getting warmer?). In each case, the investigator identifies variables that can be changed or measured (oil temperature and dough thickness for the puri; greenhouse gas levels, temperatures, and ice-cover data for climate) and variables that must be kept constant or carefully accounted for, to allow a fair comparison. Observations are recorded systematically — as simple notes and times for the puri, and as long-term data sets for climate. Conclusions are drawn from patterns in the data, and, importantly, new questions usually arise from these conclusions, driving further investigation. This shared structure — question, controlled comparison, systematic observation, evidence-based conclusion, and new questions — is what makes science a reliable method, whether applied to a kitchen counter or the entire planet, because it relies on evidence and careful reasoning rather than guesswork. (Marks awarded for correctly mapping all steps to both examples and for a clear concluding explanation of reliability.)

Keywords: *question, controlled variables, systematic observation, evidence-based conclusions, generalisability of scientific method*