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CURIOSITY — Textbook of Science for Grade 8

Chapter 1

Exploring the Investigative World of Science

Q&A Workbook — MCQs | Fill in the Blanks | Matching | Short & Long Answer | Activities

Teacher: Om Sikarwar | CBSE Board & All State Boards | Class 8

■ Arjun Rajasthan	■ Priya Kerala	■ Rohan Maharashtra	■ Sonu Punjab

■ **How to use this Workbook:** Answer each question yourself first, THEN check the answer. Highlight anything you got wrong in a different colour and revise it again. The Teacher's Notes are Om Sir speaking to you directly — read them carefully!

SECTION 1 — Multiple Choice Questions (MCQs)

■ *Each question has only ONE correct answer. Circle or tick your choice, then check the answer and explanation below.*

Total Questions: 15 | Marks: 1 mark each | Total: 15 marks
This section tests your understanding of all the key concepts in Chapter 1.

Q1. Science always begins with which of these?

A) Reading a thick textbook
B) Asking 'Why?' or 'How?' about things around us
C) Memorising all the answers
D) Going to a laboratory

Answer: B) Asking 'Why?' or 'How?' about things around us

■ *Teacher's Note: Om Sir always says — Science ki shuruwat hoti hai ek simple sawal se. Jab Arjun ne puri dekhi aur socha 'kyun?', wahi tha science ka pehla step!*

Q2. What does 'Systematic Investigation' mean?

A) Doing many experiments all at once
B) Changing one variable at a time and keeping others constant
C) Guessing the answer without any experiment
D) Copying results from a book

Answer: B) Changing one variable at a time and keeping others constant

■ *Teacher's Note: Rohan ne experiment mein ek saath teen cheezein badal deen — Om Sir ne roka! Ek baar mein ek hi variable change karo, warna result confuse ho jayega.*

Q3. In the famous puri experiment, which is an example of a Dependent Variable?

A) The temperature of the oil
B) The type of flour used
C) How much the puri puffs up
D) The thickness of the dough

Answer: C) How much the puri puffs up

■ *Teacher's Note: Dependent variable woh hota hai jo khud change hota hai — hum control nahi karte. Puri ki puffing khud-ba-khud decide hoti hai hamare changes ke result mein.*

Q4. Which of these is a Controlled Variable in the puri experiment?

A) The time taken for puri to puff
B) Whether the puri puffs or not

C) The type of flour kept the same throughout

D) The thickness of the dough being changed

Answer: C) The type of flour kept the same throughout

■ *Teacher's Note: Controlled variable wo cheez hai jo hum experiment mein SAME rakhte hain — taaki results clear aayein. Flour type same rakha, sirf oil temperature change kiya!*

Q5. In solids, why can't particles move around freely?

A) They are too heavy

B) They are packed very closely together

C) They are melted

D) They have too much energy

Answer: B) They are packed very closely together

■ *Teacher's Note: Sonu ne best example diya — Solid = bheed wali bus! Passengers (particles) itne paas hote hain ki hilna mushkil hai!*

Q6. Water (H2O) is an example of which type of substance?

A) Element

B) Mixture

C) Compound

D) Pure metal

Answer: C) Compound

■ *Teacher's Note: Water mein Hydrogen aur Oxygen chemically bonded hote hain — isliye yeh compound hai. Isko physically alag nahi kar sakte, chemical reaction chahiye!*

Q7. Which of the following is the best example of a Mixture?

A) Gold (Au)

B) Common salt (NaCl)

C) Sea water

D) Oxygen gas (O2)

Answer: C) Sea water

■ *Teacher's Note: Priya ne note kiya — sea water mein salt, minerals, aur paani physically mixed hote hain. Inhe evaporation ya filtration se alag kar sakte hain!*

Q8. Why does the Moon appear to change shape every night?

A) The Moon is actually changing its shape

B) Clouds are covering different parts of the Moon

C) Different portions of the Moon are lit by the Sun as its position changes

D) Earth is blocking sunlight from reaching the Moon every night

Answer: C) Different portions of the Moon are lit by the Sun as its position changes

■ *Teacher's Note: Sonu ne torch experiment se samjha — Moon ka shape nahi badlata! Earth, Moon aur Sun ki relative positions change hoti hain, isliye alag-alag hissa roshan dikhta hai.*

Q9. Light bending when it passes through a lens is called —

A) Reflection

B) Refraction

C) Absorption

D) Diffusion

Answer: B) Refraction

■ *Teacher's Note: Rohan ke spectacles kaam kaise karte hain? Light lens se guzarte waqt bend hoti hai — ise Refraction kehte hain. Reflection tab hota hai jab light wapas bounce ho.*

Q10. What is the most important thing a scientist should do during an experiment?

A) Complete the experiment as fast as possible

B) Keep careful notes of every observation

C) Only write down results that seem important

D) Repeat only the successful experiments

Answer: B) Keep careful notes of every observation

■ *Teacher's Note: Priya ne apni notebook carefully rakhI — Om Sir ne kaha ki chota sa observation bhi naya question khol sakta hai. Did oil smoke? Did puri puff in 3 or 5 seconds? Sab note karo!*

Q11. Which human activity is causing Earth's climate to change?

A) Planting more trees

B) Using solar energy

C) Burning fossil fuels and releasing greenhouse gases

D) Building schools and hospitals

Answer: C) Burning fossil fuels and releasing greenhouse gases

■ *Teacher's Note: Rohan serious ho gaya — hum log cars, factories aur power plants mein fossil fuels jalate hain. Isse CO2 aur doosri gases badhti hain, temperature badh jaata hai!*

Q12. Purnima (Full Moon) occurs when —

A) The Moon is between Earth and the Sun

B) The Moon is on the opposite side of Earth from the Sun

C) The Moon is very close to Earth

D) The Sun is between Earth and the Moon

Answer: B) The Moon is on the opposite side of Earth from the Sun

■ *Teacher's Note: Arjun ne samjha — Purnima tab hoti hai jab Earth beech mein hoti hai. Sun ek taraf, Moon doosri taraf — poora Moon roshan dikhta hai!*

Q13. What does the Ozone layer do for life on Earth?

A) Gives us oxygen to breathe directly

B) Keeps Earth warm by trapping heat

C) Protects us from harmful ultraviolet (UV) rays from the Sun

D) Helps plants to grow faster

Answer: C) Protects us from harmful ultraviolet (UV) rays from the Sun

■ *Teacher's Note: Priya ne sochte hue kaha — Earth ek protective blanket mein lipta hai! Ozone layer UV rays ko rok leti hai, warna hamare skin ko bahut nuksan hota!*

Q14. Which of the following is a pure Element?

A) Table salt (NaCl)

B) Iron (Fe)

C) Sea water

D) Tea

Answer: B) Iron (Fe)

■ *Teacher's Note: Element sirf ek type ke atoms se bana hota hai — Iron (Fe) ek pure element hai. Salt mein Sodium AND Chlorine dono hain, isliye compound hai!*

Q15. Gas particles behave differently from solid particles because —

A) Gas particles are heavier

B) Gas particles move very slowly

C) Gas particles are far apart and can move freely in all directions

D) Gas particles are always cold

Answer: C) Gas particles are far apart and can move freely in all directions

■ *Teacher's Note: Sonu ki analogy yaad hai? Gas = highway pe akeli gaadi — bahut space, bahut freedom! Solid mein particles bahut paas hote hain, gas mein bahut door.*

SECTION 2 — Fill in the Blanks

✍■ *Fill each blank with the correct word. Answers are given below — but try first!*

Total Questions: 18 | Marks: 1 mark each | Total: 18 marks

Q1. Science begins with careful _____ and asking questions.

Answer: observation

Q2. Changing _____ variable at a time is the golden rule of investigation.

Answer: one

Q3. The variable we deliberately change is called the _____ variable.

Answer: independent

Q4. The variable that changes on its own as a result is called the _____ variable.

Answer: dependent

Q5. The variables kept the same throughout an experiment are called _____ variables.

Answer: controlled

Q6. Everything around us is made of tiny _____.

Answer: particles

Q7. In _____ , particles are packed very closely and cannot move much.

Answer: solids

Q8. In _____ , particles are far apart and move very freely.

Answer: gases

Q9. A substance made of only one type of atom is called an _____.

Answer: element

Q10. Two or more elements chemically bonded together form a _____.

Answer: compound

Q11. Salt and water mixed together (without a chemical reaction) form a _____.

Answer: mixture

Q12. Light bouncing back from a smooth surface is called _____.

Answer: reflection

Q13. Light bending when it passes through a lens is called _____.

Answer: refraction

Q14. The Moon shines because it _____ light from the Sun.

Answer: reflects

Q15. A Full Moon (Purnima) occurs when the Moon is on the _____ side of Earth from the Sun.

Answer: opposite

Q16. The _____ layer in our atmosphere protects us from harmful UV rays.

Answer: ozone

Q17. Human activities are causing Earth's _____ to change, leading to extreme weather.

Answer: climate

Q18. Scientists always write down every _____ during an experiment, even if it seems unimportant.

Answer: observation

SECTION 3 — Match the Following

■ *Match each term in Column A with the correct description in Column B.*

Total: 10 matches | Marks: 1 mark each | Total: 10 marks

Column A — Term	Your Answer	Column B — Description
1. Independent Variable	_____	A. Light bending when passing through a lens
2. Controlled Variable	_____	B. The thing we deliberately change in an experiment
3. Dependent Variable	_____	C. A substance made of only one type of atom
4. Element	_____	D. Full Moon — Moon opposite to Sun
5. Compound	_____	E. Light bouncing back from a mirror
6. Mixture	_____	F. Two or more elements chemically bonded
7. Reflection	_____	G. Keeps all conditions the same throughout
8. Refraction	_____	H. Changes on its own as a result of our experiment
9. Purnima	_____	I. Protects Earth from UV rays
10. Ozone Layer	_____	J. Two or more substances physically mixed

Answer Key — Matching

#	1	2	3	4	5	6	7	8	9	10
	B	G	H	C	F	J	E	A	D	I

SECTION 4 — Short Answer Questions

■■ *Answer in 3 to 5 sentences. Use your own words — think like Arjun, Priya, Rohan, and Sonu!*

6 Questions | Marks: 3–4 marks each | Total: 20 marks
Write clearly and in complete sentences. Use examples wherever you can.

Q1. What is Systematic Investigation? Write in your own words. *[3 marks]*

Answer: Systematic Investigation means carefully testing one thing at a time to find the answer to a question. We change only one variable, keep all other things the same, and write down every observation we make. This helps us understand exactly what is causing the result.

Q2. Arjun asks: 'Why does one side of a puri always stay thinner?' How would you begin investigating this as a scientist? *[4 marks]*

Answer: First, we observe that one side is thinner. Then we ask a scientific question — does the thickness of the dough affect how the puri puffs? We plan an experiment: use puris of different thicknesses, keep the oil temperature the same, and note which puri puffs more evenly. We change only one thing at a time and record all observations.

Q3. What is the difference between a Compound and a Mixture? Give one example of each. *[4 marks]*

Answer: A Compound is formed when two or more elements join together through a chemical reaction. They cannot be separated physically. Example: Water (H_2O) — Hydrogen and Oxygen are chemically bonded. A Mixture is formed when two or more substances are physically combined and can be separated. Example: Sea water — salt and water can be separated by evaporation.

Q4. Why does the Moon appear to have different shapes (phases) during the month? *[3 marks]*

Answer: The Moon does not actually change its shape. As the Moon moves around Earth, different portions of it are lit by the Sun. When we look from Earth, we see different amounts of the lit portion — sometimes the full circle (Purnima), sometimes half, sometimes a thin crescent. This is caused by the changing positions of Earth, Moon, and Sun.

Q5. What is the difference between Reflection and Refraction of light? *[3 marks]*

Answer: Reflection occurs when light bounces back from a surface — like when we see our face in a mirror. Refraction occurs when light passes through a material (like glass or water) and bends — like in spectacle lenses or a magnifying glass. Reflection = bounce back. Refraction = bend and pass through.

Q6. Why is Earth called a 'Just Right' planet for life? *[3 marks]*

Answer: Earth is at just the right distance from the Sun, so water stays liquid (not frozen or boiled away). It has an atmosphere that gives us oxygen to breathe. The Ozone layer protects us from harmful UV rays. These conditions together make Earth the perfect place for all kinds of life to exist.

SECTION 5 — Long Answer Questions

■ *Answer in 6 to 10 sentences. Think deeply — these questions want you to explain AND give examples.*

3 Questions | Marks: 6 marks each | Total: 18 marks
Read every part of the question carefully. Give structured answers.

Q1. Priya is doing an experiment to find out whether the temperature of oil affects how quickly a puri puffs up. (a) Name the Independent, Dependent, and one Controlled Variable in her experiment. (b) Why is it important to change only one variable at a time? (c) What should Priya note down during the experiment? ***[6 marks]***

Answer: (a) Independent Variable: Temperature of the oil (this is what Priya changes).
Dependent Variable: How quickly the puri puffs up — the time in seconds (this changes on its own).
Controlled Variable: Thickness of the dough / type of flour / way of dropping puri (kept the same).

(b) If Priya changes oil temperature AND dough thickness at the same time, she won't know which change caused the result. By changing only one variable, she can be sure that any difference in the result is because of that one thing — oil temperature.

(c) Priya should note: the oil temperature used, whether the puri puffed or not (yes/no), how many seconds it took to puff, whether the oil smoked or splattered, and any other unexpected things she observes. Good scientists write down everything — even small details!

Q2. 'Everything around us is made of tiny particles.' Explain how the behaviour of particles is different in solids, liquids, and gases. Use the examples of ice, water, and steam to support your answer. ***[6 marks]***

Answer: Everything is made of tiny particles that are too small to see with the naked eye.

In Solids (Ice): Particles are packed very closely together. They cannot move around freely — they only vibrate in their fixed positions. This is why ice keeps its shape. Sonu compared this to a packed bus — no one can move!

In Liquids (Water): Particles are a bit further apart. They can slide past each other, which is why water flows and takes the shape of its container. There is some space between particles.

In Gases (Steam/Water Vapour): Particles are very far apart and move very quickly and freely in all directions. This is why steam spreads out to fill any container. Sonu compared this to a lone car on a highway — full freedom!

Conclusion: All three — ice, water, and steam — are made of the SAME water particles (H2O). The difference is only in how much energy the particles have and how far apart they are.

Q3. 'We are the problem and we are also the solution.' Explain what Sonu meant when she said this about Climate Change. What can Class 8 students do to help? ***[6 marks]***

Answer: Sonu meant that human activities are causing climate change — burning fossil fuels, cutting forests, and industrial pollution release greenhouse gases that trap heat and warm the Earth. Changing climate causes droughts, floods, extreme storms, and rising sea levels, threatening life on Earth. So WE are the problem.

But science gives us the knowledge and tools to understand what is happening and to make better choices. We can use renewable energy (solar, wind), plant trees, reduce waste, and make governments and industries accountable. So WE can also be the solution.

What Class 8 students can do:
— Switch off lights and fans when not in use
— Use bicycles or walk for short distances instead of taking vehicles
— Plant trees in the school or neighbourhood
— Avoid single-use plastic — use cloth bags and steel bottles
— Spread awareness among family and friends

Om Sir always says — the same scientific principles we are learning now will help us protect the delicate balance on which life depends!

SECTION 6 — Activities & Projects

■ *These activities are the HEART of Chapter 1. Science is not just reading — it is DOING. Try at least 3 of these activities and show Om Sir your work!*

Activity 1 — Kitchen Scientist! ■

1. Ask a parent or elder to help you fry one or two puris at home.
2. Before frying, prepare two balls of dough: one thin, one thick.
3. Fry them one at a time in the same oil at the same temperature.
4. Observe carefully: Does one puff up more? How many seconds does it take?
5. Note down everything you see — even if the oil bubbles differently!
6. Write a one-paragraph conclusion: What did you find out?

★ ***Om Sir says:*** *Remember Om Sir's Golden Rule: Change only ONE thing — the dough thickness. Keep oil temperature and drop method exactly the same! This is real science happening in your kitchen.*

Activity 2 — Moon Phases Diary ■

1. For the next 30 days (one lunar month), look at the Moon each evening.
2. Draw the shape you see in a small circle in your notebook.
3. Label it with the date and time of your observation.
4. Find out the dates of Purnima (Full Moon) and Amavasya (New Moon) for this month.
5. Count the days between Purnima and Amavasya. What do you notice?
6. Compare your drawings with a classmate — did you both see the same shapes?

★ ***Om Sir says:*** *This is exactly what ancient Indian astronomers did to create our calendar! Chaitra, Vaishakh, Phalgun — all are named based on Moon's position. You are doing 5000-year-old science!*

Activity 3 — Sorting Materials ■

1. Look around your home and list 10 different materials or substances.
2. For each one, decide: Is it an Element, Compound, or Mixture?
3. Hint: Iron nail, salt, tea, copper wire, sugar solution, air, gold ring...
4. Make a 3-column table: Element | Compound | Mixture.
5. For each Mixture you found, think: How could you separate it?
6. Share your table with Om Sir — compare with your classmates' lists!

★ ***Om Sir says:*** *Priya loved this activity! She found that the air we breathe is a mixture of many gases — oxygen, nitrogen, CO_2, and others. What did YOU discover?*

Activity 4 — Light and Mirrors Observation ■

1. Take a small torch (or use your mobile phone torch) in a dark room.
2. Shine it on a flat mirror. Observe how light bounces back (Reflection).
3. Now fill a glass of water and put a pencil inside. Look at it from the side.
4. Does the pencil look bent at the water surface? That is Refraction!
5. Try shining light through a magnifying glass onto a wall. What do you see?
6. Write: One place where you see reflection in daily life. One place where you see refraction.

★ ***Om Sir says:*** *Rohan was amazed — his spectacles are working on refraction every single day! Science is not just in labs, it is in every pair of glasses, every spoon, every puddle on the road.*

Activity 5 — My Science Journal ■

1. Start a special 'Science Journal' notebook just for this year.
2. Every day, write ONE thing you observed that made you curious.
3. It can be anything — why does hot food steam? Why is the sky blue at noon but orange at sunset?
4. Write your question, your guess (hypothesis), and if possible, find an answer.
5. At the end of each month, look back at your questions.
6. Bring your most interesting question to class — Om Sir will discuss it with everyone!

★ ***Om Sir says:*** *Remember — even the question 'Why does a puri puff up?' is not fully understood by scientists yet! Your curiosity is the most powerful tool you have. Keep it sharp!*

SECTION 7 — Probe and Ponder ■

■ *These are open-ended questions — there is no single correct answer! Think about them, discuss with friends and family, and bring your ideas to class. Om Sir loves these discussions the most!*

■ **1.** Why is one side of a puri thinner than the other? (This is the big question from Chapter 1 — can you investigate it yourself now?)

My thoughts: _____

_____

_____

■ **2.** Are there more grains of sand on all the beaches of the world, or more stars in our galaxy? What do YOU think — and how would a scientist find out?

My thoughts: _____

_____

_____

■ **3.** If everything is made of particles, what is between the particles? Is it empty space — or something else?

My thoughts: _____

_____

_____

■ **4.** Why do we see our reflection in a still pond but not in muddy or rippling water?

My thoughts: _____

_____

_____

■ **5.** The Moon has no atmosphere. Does that mean life can never exist there? What conditions are absolutely essential for life?

My thoughts: _____

_____

_____

■ **6.** If human activities are causing climate change, do you think individual choices (like switching off a fan) can really make a difference? Discuss!

My thoughts: _____

_____

_____

SECTION 8 — Quick Review: Key Concepts at a Glance

Concept	What it means	Example from our story
Systematic Investigation	Testing one variable at a time	Arjun: changing dough thickness while keeping oil temp same
Independent Variable	What we deliberately change	Oil temperature in puri experiment
Dependent Variable	What changes as a result	How quickly puri puffs up
Element	Pure substance, one type of atom	Gold (Au), Iron (Fe), Oxygen (O2)
Compound	Elements chemically bonded	Water (H2O), Salt (NaCl)
Mixture	Substances physically mixed	Tea, sea water, soil, air
Reflection	Light bouncing back from surface	Mirror, calm water surface
Refraction	Light bending through material	Rohan's spectacles, magnifying glass
Moon Phases	Different portions of Moon lit by Sun	Purnima (full), Amavasya (new), Crescent
Climate Change	Human activity warming Earth	Sonu: 'We are the problem AND the solution!'

■ My Score Tracker — Mark Yourself!

Section	Maximum Marks	My Score	Revision needed?
Section 1 — MCQs	**15**	___ / 15	Yes / No
Section 2 — Fill in the Blanks	**18**	___ / 18	Yes / No
Section 3 — Matching	**10**	___ / 10	Yes / No
Section 4 — Short Answer	**20**	___ / 20	Yes / No

Section 5 — Long Answer	**18**	___ / 18	Yes / No
TOTAL	**81**	**___ / 81**	*Keep going!* ■

"Whether it is the swelling of a puri or the shrinking bright part of the Moon after purnima, let your careful observations guide you along your explorations into the Investigative World of Science."

— NCERT Curiosity, Class 8 Science

Om Sir adds: You are not just students. You are young investigators. Stay curious. Stay careful. Stay creative.

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