MEMUNIC SPACE EXPLORERS

Memoon and the Laws of Orbits

Adventures with Memoon and Friends

Book 11 · Grade 11



MEMUNIC SPACE EXPLORERS

Adventures with Memoon and Friends

Memoon and the Laws of Orbits

Book 11 · Grade 11 · Ages 16 to 17 · Independent reading

About this book

Published November 2026.

The Memunic characters and world belong to the series creator. The illustrations were made with AI image tools from the series character descriptions and checked by hand against the official reference sheet, so they may differ slightly from the official artwork. The diagrams were drawn by hand and by calculation for accuracy, and each says what it simplifies.

The science was fact-checked on 3 November 2026 against the sources listed at the back. Dates and mission details change, so they are printed with the date they were checked. Talking animals and Imagine Mode are only in the story. The satellite SkyClub-1 and the contest in it are fictional, and nothing in the book is built or launched.

Safety first. Never look straight at the Sun, and never point binoculars or a telescope near it. Adults should supervise every activity, and night sky-watching always needs an adult. Never shine a torch into anyone's eyes.

INSIDE THIS BOOK

Contents

Meet Memoon and her friends 4
Be a Space Detective 5
1. The Design Brief 6
2. Newton's Cannon 14
3. The Strength of Gravity 22
4. Falling Around the World 30
5. Kepler's Three Rules 39
6. Weighing a World 48
7. The Energy of an Orbit 56
8. Escape 64
9. Low or High? 72
10. The Long Way Up 80
What We Found Out 90
Glossary 91
Space Detective Quiz 94
Answers and Explanations 95
Orbit Design Sheet 96
Sky Heroes of India and the World 97
Mistake Museum 98
Look Up Tonight 99
Orbit Engineer Badge and Star-Night Guide 100
For Parents and Teachers 101
Sources and Fact-check 102
Next Adventure 103

THE CLUB

Meet Memoon and her friends

Memoon is curious and kind. She loves animals and learns by asking questions and trying things out.

Noodles the fluffy cat has big feelings and a silly side.

Kachui the turtle thinks slowly and carefully, and keeps the numbers straight.

Nimo the little fish is wise, and always floats in his bubble.

Beautine the squirrel loves a little drama and a big plan.

Simbha the lion is gentle and affectionate, and loves a challenge.

Guddu is Memoon's older cousin, about sixteen, who joins by video call.

Story note: talking animals are only in the story. Real animals do not talk.

HOW TO READ THIS BOOK

Be a Space Detective

This book asks a big question: which orbit should a small satellite use, and can you prove your design works? To answer it, the Club uses mathematics, measurement and honest reasoning.

Two tracks. Every Science Corner has a **maths track** with formulas and numbers, and a **concept track** that explains the same idea in words. You can follow either one and return to the other later.

The assumptions rule. Every answer rests on simplifications, such as a spherical Earth. Say what you assumed, give units, and round sensibly.

Keep a Sky Notebook. In every chapter, notice, ask, predict, test, compare and explain. When a model or analogy appears, ask what it shows well and where it stops working.

The most important rule: we never look straight at the Sun.

CHAPTER 1

The Design Brief

In this chapter: Frame an engineering question as a testable design brief, list the quantities and assumptions it needs, and correct the idea that there is no gravity in space by recognising an orbit as free fall.

The message arrived on a Sunday evening in February, in the middle of an argument about biscuits.

The Rooftop Sky Club had carried the folding chairs up to the terrace for the first time since the winter, and Mrs Rao had sent up a steel tin of biscuits with a note that said *share equally*, which Beautine had taken as a mathematical challenge. She was dividing eleven biscuits among five members and a lion, and she had reached the conclusion that the lion should be treated as a special case.

“A lion is not a special case,” said Kachui. “A lion is one member. Two biscuits each, and one left over.”

“Who gets the one?”

“Whoever finds the better question,” said Memoon, without looking up. She was sitting on the parapet with the laptop open on her knees and the Sky Notebook beside her, its cover now soft at the corners from a year of carrying. The laptop had made its small bell-like sound, and a green bar had appeared at the top of the screen.

“It is Guddu,” she said. “She is calling. Everybody sit down. Noodles, off the biscuit tin.”

“I am not on the tin. I am adjacent to the tin.”



The Sky Club meets Guddu by video call

Guddu's face appeared on the screen, a little grainy, in a room with a bookshelf and a window and the faded blue T-shirt that she wore for every important conversation. Her dark ponytail swung into view as she leaned toward the camera. She was sixteen, in her last two years of school, and she had the particular look of a person who has been carrying an idea around all day and is terrified that it is too big.

"Hi, Sky Club. I need to ask you something huge, and you are allowed to say no."

"We are never allowed to say no to huge," said Beautine.

"My school is entering a competition," said Guddu. "It is called the Young Designers' CubeSat Challenge. Teams of students design a small satellite on paper, with the science, the numbers, the lot, and a panel of engineers reads them and picks the best design. Nothing is built and nothing is launched. It is all design. We have eleven weeks." She took a breath. "Our teacher said the best entries are the ones that make a real choice and defend it with calculations. And I thought of you, because of the spectra. Because of the twinkle."

Simbha, who had been sitting like a statue at the end of the row, lifted his great head. "The twinkle."

"You worked out in Book 10 that the air is the problem," said Guddu. "A star's light crosses the whole atmosphere, and the air shuffles it around. That is why Sirius dances and why even the big telescopes have to fight the blur. So what if the instrument sat above all of it?"

“A spectrograph in space,” said Memoon, very softly.

“A small one. A little slit and a little grating, like your shoebox, only built properly, inside a satellite the size of a loaf of bread.” Guddu held up her hands, one above the other, to show something about as long as a forearm. “A CubeSat. They are made of units, each unit a cube ten centimetres on a side. We want three units in a row, a 3U, so ten by ten by thirty-four centimetres or thereabouts. The competition says the mass must be under four kilograms.”

“Four kilograms,” said Beautine, with deep respect. “That is lighter than the biscuit tin when it is full.”

“That is the point of them. They are small enough that students can design them and cheap enough that real ones fly. But a design needs an orbit, and I do not know which one to pick, and my team keeps arguing about it, and I know that you know how to turn an argument into a calculation.” She hesitated. “Would you design the orbit for us? The Club’s part is the physics. What speed, what height, what period, how much energy, how it gets there. We will do the electronics and the instrument.”

There was a pause, filled with the distant sound of a bus.

“What is the satellite called?” asked Noodles.

Guddu laughed. “We do not have a name yet.”

“SkyClub-1,” said Noodles at once. “Obviously. It is a fine name. I am surprised nobody thought of it.”

“SkyClub-1,” said Guddu. “Fine. For now. Is that a yes?”

Memoon looked along the row of faces: Kachui, who had already opened the logbook; Beautine, who had stopped dividing biscuits; Simbha, whose tail had begun to sweep slowly from side to side; Nimo, floating at the rim of the water tank in his bubble, who had stopped pretending to be asleep.

“That is a yes,” she said. “But a yes comes with a condition. We do this properly. Every number has a source or a stated assumption. If we guess, we say we are guessing.”

“That is the best condition anyone has ever given me,” said Guddu, and the call ended in a flurry of goodbyes and one more promise to send the competition rules.

The terrace was quiet.

“Right,” said Beautine, in the tone of a general unrolling a map. “The orbit. It is simple. We want the instrument to be above the air, so the answer is: as high as possible. Put it so far away that the atmosphere is a rumour. The Moon! Put it at the Moon!”

“The Moon is a long way,” said Kachui.

“The Moon is the *answer*,” said Beautine. “Far away, no air, no twinkle, nothing in the way. Higher is always better.”

Memoon had been about to write the sentence down, and her pencil stopped in the air. She knew that feeling by now. It was the feeling of agreeing with something because it sounded sensible, and a Sky Club rule hung over every Sky Club evening: *the first sensible-sounding answer is a suspect, not a witness.*

“Wait,” she said. “Higher is better for the air. Is it better for everything else?”

“What else is there?” asked Beautine.

“The signal. A radio message has to cross the distance. The Sun and the Moon are far, so the signal is faint. And the energy to get there. And how long it takes to go round, because if SkyClub-1 takes a month to go round, we get one observation a month.” She was writing as she spoke, three words and a bracket and an arrow. “I do not know the answers. That is why I want to find out, not guess.”

“Then I propose,” said Noodles, standing on the tin with the air of a king mounting a throne, “a simpler solution. Space has no gravity. That is what everyone says. The astronauts float. So up there, nothing falls, and we just put SkyClub-1 wherever we like and it stays. Done. Where is my biscuit?”

The row of faces turned to him.

“No gravity in space,” said Kachui, without any unkindness, “is an idea you wrote in your own notebook in Book 5. And Book 9 corrected it.”

“Did it?”

“We worked out that the pull of gravity falls with the square of the distance,” said Simbha, in his slow, deep voice, “and that it never reaches zero. At the Moon the pull from Earth is still enough to bend the Moon’s path into a circle. Nothing stays where you put it. Everything falls.”

“Then why do the astronauts float?” asked Noodles, a little desperately.

Nimo’s bubble rose to the top of the tank. “May I?” he said. “I think I can help with this one. It is the water. It is always the water with me. Suppose you are standing in a lift and the cable is cut.”

“I would rather not suppose that.”

“Imagine,” said Nimo, and a small silver sign blinked in the air above his bubble. **Imagine Mode on. What follows is imaginary.** “Imagine a lift with no floor, no friction, falling freely, and you inside it with a ball. You let go of the ball. What does it do?”