Little House of Science

Christmas 2025

15-19 December

The Science Discovery Lab: Where Physics, Chemistry, and Biology collide!

Each day at our camp is dedicated to a specific field of science—such as Physics, Chemistry, Biology, or Geology —offering four exciting and unique topics carefully selected to spark curiosity and go beyond the typical school curriculum. Our experienced teachers, who are also passionate scientists, bring their expertise and enthusiasm to every lesson, ensuring that each topic is fresh, engaging, and full of discovery. Every session includes dynamic demonstrations, hands-on experiments, and lively discussions. The children explore exciting science topics inspired by Stephen Hawking's discoveries about the universe. They'll learn how **solar energy** converts sunlight into power, and how **magnetism** influences everything from compasses to motors. The lesson on **graphene** and **material properties** shows how new materials are changing technology. Kids will also study **electricity**—how it works and powers our world—and discover how **clouds** form and create lightning storms.

DAY 1 Monday Masters of the Universe: Newton, Einstein & Hawking

What Is Gravity? — The Science of Staying Grounded at Christmas!

From Isaac Newton's early and brilliant observations to Albert Einstein's modern alterations, today we discover the phenomenon that holds our Universe together. Ever wondered why we float in space but stay firmly planted on Earth? We'll explore how gravity makes objects fall, why astronauts experience weightlessness, and why you might be a bit taller in the morning than in the evening. We'll also delve into the groundbreaking discovery of **gravitational waves** — ripples in spacetime caused by massive cosmic events like colliding black holes — which reveal how gravity not only shapes our everyday lives but also sends signals across the vastness of the Universe.

Discover the fascinating science behind gravity, from the falling apple to the fabric of the cosmos itself.

Reindeer Dynamics: Unpacking Newton's Laws This Christmas

Get ready for two festive and fun-filled science sessions where we explore the incredible world of motion and forces—all through the lens of **Isaac Newton's famous laws** and some Christmas magic!

In **Part 1**, children will discover how Newton's First and Second Laws explain everything from why Santa's sleigh starts and stops, to why your presents don't go flying off the sleigh when he turns corners (well, not if he's careful!). Through interactive demonstrations and hands-on experiments, we'll learn how force, mass, and acceleration come together to keep the season moving.

In **Part 2**, we bring **Newton's Third Law** to life: for every action, there is an equal and opposite reaction! We'll launch candy canes, test out sleigh propulsion models, and experiment with mini-reindeer rockets to see how this powerful law works in action.

From falling snowflakes to zipping sleighs, these sessions are packed with winter-themed experiments and discoveries that reveal the science behind the wonders of the season.

Time Travel with Stephen Hawking

When astronaut Scott Kelly returned from over a year on the International Space Station, he was 6 minutes younger than his twin brother! In this penultimate workshop, we'll dive into the mysterious realm of time and how we perceive it. We'll explore the fascinating effects of time dilation, how gravity influences our experience of time, and the mind-bending concept of **black holes**. Discover whether these cosmic enigmas could function as time machines and learn about the incredible science behind their formation and behaviour.

DAY 2 Tuesday: Biology: A Festive Look at DNA and Anatomy

The Christmas Code: Discovering the DNA That Makes You

In this lesson, we are unwrapping one of the greatest gifts of all—your DNA! The children will explore the genetic code that makes every person unique, just like a snowflake. We'll dive into the double helix, learn about genes, chromosomes, and inherited traits, and even create festive DNA models using candy canes and marshmallows. From eye color to why you might love Brussels sprouts (or not!), we'll uncover how the "Christmas Code" written inside every cell shapes who we are. Get ready for a magical mix of biology and holiday cheer, where science helps us discover the story written inside us all.

The Christmas Plate: A Journey Through Nutrition

What happens after we enjoy a slice of Christmas cake or a spoonful of mashed potatoes? In this deliciously educational session, children will take a journey through the science of **nutrition and digestion**, exploring what really happens when festive treats enter the body. We'll break down the key **nutrients**—from proteins and fats to vitamins, minerals, and carbohydrates—and discover how they help our bodies grow, heal, and stay energized through the holidays. Along the way, we'll look at the role of **sugar**, learn how different elements are absorbed during digestion, and follow the incredible path food takes from plate to cell. Packed with fun facts, interactive activities, and plenty of holiday spirit, this lesson shows how even a Christmas feast can be a chance to learn what keeps us healthy and strong.

The Thinking Elf: Magic of Neuroscience

Join us for a festive deep dive into the most powerful organ in your body—**the brain**! In this holiday-themed neuroscience adventure, children will explore how the brain works, how it helps us think, feel, move, and even remember where we hid the Christmas presents!

We'll uncover the role of **neurons** and **synapses**, see how **electrical signals** travel through the brain, and learn how different parts of the brain control emotions, memory, senses, and coordination. From the **prefrontal cortex** that helps us make decisions (like choosing cookies for Santa) to the **amygdala** that lights up with excitement on Christmas morning, we'll bring complex neuroscience to life through hands-on experiments and festive fun.

DAY 3 Wednesday Botany and Evolution and Engineering

The Power of Seeds

Children will explore how tiny seeds hold the key to life on Earth. Through fun planting activities, close-up seed investigations, and engaging discussions, kids will learn how seeds grow, how they travel, and why they're essential to our food, forests, and future. They will also discover the incredible world of seed banks—special places around the world that store and protect seeds to help preserve plant life for generations to come. This lesson blends biology, ecology, and sustainability.

Tangled in the Web: Exploring Food Chains and Food Webs

From buzzing bees to top predators, kids will explore food chains and food webs to understand how energy flows through ecosystems and why even the tiniest creatures play an important role in keeping **nature in balance**. Through fun games, drawing activities, and real-world examples, students will learn about **producers, consumers, and decomposers**, as well as key ecological terms like **trophic levels**, **biomass**, and **interdependence**. They will discover how energy is transferred through living organisms and how changes in one part of the web—like the loss of a single species—can impact the entire system.

Jane Goodall: Unleashing the Secrets of Chimpanzees

Step into the wild with us as we embark on an inspiring journey through the life of **Jane Goodall**! In this captivating lesson, we'll explore how Goodall revolutionized our understanding of primates with her pioneering research on chimpanzees in Tanzania. Discover her incredible observations—like chimps using tools and forming complex social structures—and learn about her lasting impact on conservation and animal welfare. Learn

about her lasting impact on conservation and animal welfare through engaging stories and interactive activities. Children will gain a deep appreciation for the natural world, the science of evolution, and the importance of protecting our planet.

How Do Helicopters and Dragonflies Fly? Unveiling the Secrets of Spinning Wings

The word helicopter means 'spinning wing' - *helico –pter.* These marvels of modern engineering have their roots in the natural world. In this topic we will construct our own twirling flying machines as we learn about nature's most superb flyers, from spinning sycamore seeds to the world's most successful flying predator, the dragonfly.

DAY 4 A day in Cosmos

Mission: Solar System

From the blazing Sun to the icy edges of Neptune, kids will explore the planets, their orbits, and what makes each one unique. Through interactive activities, model-making, and storytelling, they'll learn about gravity, rotation and revolution, moons, and asteroids, while developing a deeper understanding of Earth's place in the universe. They'll also take a look at **Pluto**, once considered the ninth planet, and discover why it's now called a **dwarf planet**, adding a fun twist to the story of our ever-changing understanding of space.

Our Brilliant Sun: Unlocking the Secrets of Solar Power and Green Energy

The Sun is our solar system's ultimate power generator, fuelling nearly all life on Earth with its light and heat. In this session, we'll uncover the secrets of how the Sun works and delve into the fascinating type of matter it's made from. We'll also explore how this solar energy inspires innovations like **solar batteries** and **green energy** solutions, showing us how to harness the Sun's power for a sustainable future. Join us as we shine a light on the Sun's remarkable role in both nature and technology!

Sky Architects: The Science of Clouds

Clouds aren't just there to look pretty – they play a very important role in the weather. Some clouds bring sunshine, while others bring rain, snow, or even thunderstorms! We will discover what clouds are made of, how they form, and why there are so many different types. So, let's get ready to become cloud experts and learn about the water in the sky.

Comets, Asteroids and Other Cosmic Rocks

The Solar System is studded with millions of jewels. In this session about space rocks, we discuss the history of comets, meteor showers and asteroids, and how these objects have helped shape the planets. We will also learn about the challenges faced by scientists who study these micro-worlds such as how we might land on one or sample its surface.

DAY 5 Friday: The World of Chemistry

Matter in Action: Investigating Materials and Their Powers

From the toughness of steel to the flexibility of rubber and the see-through magic of glass, kids will explore how materials behave and why it matters. Through experiments, observations, and real-world examples, students will investigate important material properties such as strength, hardness, flexibility, density, and conductivity. They'll also explore how some materials expand with heat, respond to magnets, or let light pass through. Along the way, children will be introduced to **exciting new materials** like **graphene** (stronger than steel and thinner than paper), **memory foam** and **smart materials** that react to heat, light, or pressure.

What are the States of Matter? The Science of Extreme Transformations!

What's the matter? Matter is the incredible stuff that makes up us and everything around us! It's crafted from the elements of the periodic table and exists in a variety of states or phases—more than just solids, liquids, and gases. Ever wondered what happens to matter at the extremes of temperature and pressure? In this lesson we will unravel the mysteries of atoms and witness the dazzling transformations of matter, from **sublimation** (where solids

turn directly into gases) to the awe-inspiring behaviours of matter in the most extreme conditions.

Acids and Alkalis

In this lesson, children will learn how to identify them, they will discover how substances are classified on the pH scale, the older children will understand the role of hydrogen ions (H^+) and hydroxide ions (OH^-), and see how acids and alkalis react together in neutralisation reactions to form salts and water. To bring this to life, they will learn about natural acids like formic acid**,** found in ant bites, and **citric acid**, which gives lemons their sour taste—showing how acids are all around us in nature and everyday life.