Year Four

My Homeschool

Science Strands: Physics and Chemistry

Year 4

By Michelle Morrow

Deposit Stock Images have been used for Skeleton and Muscle Diagrams.

Heart Diagram by Michelle Morrow

All enquiries to My Homeschool.

Contents

For The Parents

At My Homeschool, your child will study a variety of scientific disciplines, such as biology, Earth science, space science, physics, and chemistry. Scientists and scientific knowledge will also be examined, as well as the ways in which science affects individuals and businesses. In addition, we help your child develop their science skills by allowing them to conduct experiments, observe, document, ask questions, and evaluate data.

Our science resources combine the ideas of Charlotte Mason and modern teaching methods. The melding of these two approaches gives children the delight of learning about science through a range of literary and digital mediums. It also utilises a core idea in the Charlotte Mason method where children make connections between all the knowledge they are acquiring across all subjects – she calls this the science of relations.

The Charlotte Mason way, or immersion method, of teaching science uses living books to delve deeply into more specific topics to assist children in capturing the wonder that is found in science. Living books, notebooking, nature study and narration form the backbone of this method. We include a number of science readers at My Homeschool to help your child learn the content required for a lesson. Science authors have also been chosen for their literary style and popularity amongst Charlotte Mason homeschoolers.

Contemporary syllabi take a spiral approach to teaching science. With this method, your child is learning ideas from a range of science branches each year and those ideas are expanded as they move up through the grade levels. The ***Science Strands Handbooks*** and the ***Watch the Physics & Chemistry Links*** use the spiral method to teach science ideas appropriate for Grades Three to Six. We use the scope and sequence laid out in the Australian Curriculum as our framework. In the primary years the topics covered are introductory ideas that will be reviewed and developed over their homeschool years. If your child does not fully understand these topics at first, they will be given a chance to cover them again in subsequent years. Literature, video clips, observation and recording are all part of this resource.

Melding these two methods allows you to give your child a modern Charlotte Mason science curriculum that will consolidate and reinforce their science understanding and the science of relations.

I trust you will find this resource useful, and your child will be eager to learn more about the topics covered.

Michelle Morrow

How To Use This Resource

Your weekly planner will give you the schedule for using this handbook. In most cases there are only one or two lessons per week. Lessons are short and some may only be conversational in nature.

Key Lesson Ideas

These lessons are about cultivating ideas and not necessarily being able to list a whole lot of facts. Charlotte Mason believed that one informing idea in a lesson is enough for children to grasp and these will build upon other ideas. She said, "*Give your child a single valuable idea, and you have done more for his education than if you had laid upon his mind the burden of bushels of information*".[1]

Science Narrations & Conversations

After each reading lesson your child should orally narrate (tell you what they learnt) or make an entry in their Science Notebook. They may want to add illustrations to their notebook so a botany book with blank and lined pages works well.

Charlotte Mason suggests we ask children questions about what they are seeing. She discourages lecturing but prefers the casual pointing out of things found in the natural world. She encourages questions from children.

"*He must be accustomed to ask why — Why does the wind blow? Why does the river flow? Why is a leaf-bud sticky? And do not hurry to answer his questions for him; let him think his difficulties out so far as his small experience will carry him*." [2]

Asking your child to explain what they see is the beginning of forming a framework for reporting findings. Children don't need an attached worksheet to prove they learnt something. When a child makes a revelation through observation this is a worthy outcome. Enjoy it with them!

When you answer their questions give your answers with as much "life" as you can.

Charlotte Mason says, "*Do not embarrass him with too much scientific nomenclature. If he discovers for himself (helped, perhaps, by a leading question or two), by comparing an oyster and his cat, that some animals have backbones and some have not, it is less important that he should learn the*

[1] Charlotte Mason Series Volume 1, p. 174
[2] Charlotte Mason Series Volume 1, p. 264

terms vertebrate and invertebrate than that he should class the animals he meets with according to this difference".[3]

Science Experiments & Field Trips

In our Science Strands Year 4 there is one experiment (Lesson 4) and a project (Lessons 15 & 16). Please pre read these so you are prepared when they are scheduled. Your child will also be learning about magnets (Lesson 3) so if you can access some magnets for them to do their own experiments this will also be useful. If your child wants to do more experiments, then we suggest you allocate specific times rather than fit them in with our everyday routine. Alternatively get a group together (Homeschool co-ops can be good for this) to do an experiment. Don't ignore the everyday experiments such as: kitchen chemistry, gardening, play based physics with Lego and magnets and nature study and field trips.

Additional Science Reading

We include a number of science readers at My Homeschool to help reinforce the content required for a lesson. Although it is better to have a book on hand, to keep costs down we have sourced many of the titles online. These titles can change from time to time depending on availability.

Avoiding textbooks especially in the early years is far more interesting and valuable in your child's scientific education. Research has shown this to be superior in giving children a science foundation. An educational study on top science students in American schools found the best schools didn't use set textbooks but rather used a variety of books and resources. [4]

Science Videos

We know Charlotte Mason didn't use videos in her lessons – it wasn't an option! However, this is a great medium for teaching various topics, and we make use of that at My Homeschool. Videos do change from time to time (depending on availability) but the key ideas taught in the videos remain the same.

The Physics and Chemistry Links are found in the Virtual Cupboard of your Year 4 course. They include videos and picture book readings. Occasionally we have added some extension videos. They are usually more advanced concepts of the key idea or closely related concepts. Only pursue the extension videos if your child seems particularly interested in the topic being taught.

[3] Charlotte Mason Series Volume 1, p. 265
[4] You can teach your child successfully ©1999 cited Ruth Beechick p.321

Physics Year 4

Lesson 1: Physics: Revision Force: Friction and Gravity

In Year 1 we learnt how pushing and pulling objects is a simple example of the energy we use to create force. We tried pushing toys, opening doors and talked about the wind moving sail boats. However, the consequences of the forces at action can't be felt and seen explicitly.

To simply define force we can say, forces influence how objects move. A force is an action and then a reaction. The balance of opposing forces controls whether something sinks or floats; whether something floats in the air, falls fast or slowly; and how swiftly something travels on the ground or in mid-air. Gravity will constantly attract an object to the centre of the Earth.

Friction is like a secret superhero in our everyday lives. It's everywhere, even if we don't always see it. But what is friction? Well, imagine you're sliding on a slick, icy sidewalk. You're slipping and sliding because there's very little friction. Friction is a force that happens when two things rub together. It can slow things down or even stop them. Let's explore some fun examples to understand the good and bad sides of friction.

First, the positive side of friction. Think about playing basketball. When you dribble the ball, it bounces back to your hand. That's friction at work between the ball and the ground. Without it, the ball would just slide away. Also, when you run or walk, your shoes grip the ground. That's friction too, helping you move without slipping.

Another cool example is writing with a pencil. The pencil's tip rubs against the paper, leaving marks. That's friction making your writing possible. Even when you eat with a fork or spoon, friction helps you hold your utensils so they don't slip from your hands.

Now, let's talk about when friction isn't so helpful. Have you ever gone down a slide and suddenly stopped in the middle? That's because of too much friction between your clothes and the slide. It's like the slide is saying, "Hold on, not so fast!"

Here's another example. Have you seen a car or bike tire that's really smooth and worn out? That happens because of friction with the road. Over time, the tire gets so smooth that it doesn't grip the road well, especially when it's rainy or snowy. That can be dangerous because the vehicle can slip, just like you did on the icy sidewalk.

Also, think about moving a heavy table across a room. It's hard to push because of friction between the table's legs and the floor. You're fighting against friction to move the table. That's when friction feels like a bit of a troublemaker.

But, don't forget, friction can also keep that table from sliding around when you don't want it to move. It's like friction is saying, "I'll hold this table in place for you!"

So, friction can be both a friend and a challenge. It helps us in many ways, like keeping us safe while walking or playing sports. But it can also make some things harder, like moving heavy objects or wearing out tires.

One fun fact is that scientists and engineers often think about how to use friction in the best way. They design shoes with special soles for better grip and tires with patterns to work well in different weather. They're like friction detectives, figuring out how to make it work best for us.

In conclusion, friction is a fascinating force in our daily lives. It's essential for many things we do, like playing, writing, or just walking around. But it can also cause some troubles, like slowing us down or wearing things out. Next time you're doing something, think about how friction is helping or maybe making it a bit tricky. It's a cool way to see how science is part of your everyday adventures!

Watch the Physics & Chemistry Links