Unit Rationale

Materials and Matter

Year 2

This unit builds on directly from Year 1 – Materials and Magnets. In Year One, pupils learned about the names of everyday materials. They began to consider simple properties of everyday materials and learned about John Dunlop and his work on developing a suitable material for wheels. This unit offers another opportunity to reinforce the names and uses of every day materials, developing the conceptual understanding that all materials are used for a purpose based on their properties.
In this unit, building on their knowledge of John Dunlop and his work, pupils will study George de Mestral and will find out how he developed Velcro after noticing how the shape of burdock seeds allowed them to grip onto his clothes and his dog's fur whilst out walking. Pupils will learn how he needed to test the properties of materials in order to find something suitable for his invention. They will look at images of Velcro under a microscope.

Building on their understanding of materials and their properties, pupils will be introduced to the idea that everything we can see is made from many tiny things we cannot see, called atoms. The reason this lesson has been included here is to plant a seed of understanding for pupils that will be useful later in their science education when they study atoms more closely. They will learn that scientists cannot see atoms using a microscope, but that scientists long ago saw strange movements when looking at coal dust and pollen grains under a microscope, and they developed a theory that helped them explain what they saw. This is important disciplinary knowledge that will help children to think scientifically. They will learn that scientists use microscopes to look closely at things our eyes cannot see, but that scientists know there are even smaller things that microscopes cannot see.

Moving on from the understanding that atoms are tiny building blocks that everything around us is made from, children will study how we can change solid objects through actions such as bending, twisting and squeezing. In this lesson, we recommend explaining that the atoms within solids have strong bonds that enable the object to hold its shape. This may be something pupils have a fuller understanding of later in the curriculum, but again we are planting a seed and providing challenge for those who are ready for it. Pupils will look at the properties of solids, recognising that the shape of some, but not all, solids can be changed.

To offer a comparison with solids and how we can, or cannot, change their shape, pupils will then study the properties of liquids. This lesson has been included to extend children's knowledge of matter beyond solids. They will learn more about solids, liquids and gases in Year 4. This lesson pre-teaches some of the knowledge required for that unit creating some background knowledge for children to draw upon later in the curriculum. Pupils will learn that it is difficult for us to hold a liquid in our hands. The atoms in a liquid still maintain bonds between each other, but the bonds are much weaker than in a solid. The weaker bonds between the atoms allow them to move around. This means that liquids can be poured and liquids take on the shape of the container they are placed into.

Finally, as an assessment task, pupils will design a garden area for their school with a water feature. This builds on from the assessment in Year 1 they completed; designing a playground. This task has been designed to encourage children to think about materials and their properties and also how solids and liquids behave. Their knowledge will be built upon in Year 4 when they study the Water Cycle.