Meteorology (Chemistry and Physics)

Year 5

End Points:

- Meteorology is the study of the weather.
- The atmosphere is made up of several layers of air which protect Earth from the Sun's energy.
- The atmosphere is essential for life on Earth.
- Ozone is a gas that absorbs some of the sun's UV radiation.
- By using certain harmful chemicals, humans created a hole in the ozone layer over Antarctica.
- Since the harmful chemicals were banned, the hole in the ozone layer has been repairing.
- Our climate is called a maritime climate, because it is largely influenced by the sea.
- The polar maritime and the tropical maritime air masses bring wetter weather from the sea.
- The polar continental and the tropical continental air masses bring drier weather from land.
- The boundary where warm and cold air meet is called a front.
- Warm fronts are symbolised by a line with red semi-circles.
- Cold fronts are symbolised by a line with blue triangles.
- When electrical charge builds up and moves through the atmosphere, it creates a flash of light and sound.
- Light travels faster than sound, so we often see lightning before we hear thunder.

In this unit, children will deepen their understanding of meteorology: the study of the weather. Building on the children's existing schemas, the substantive concepts of this unit will focus on **weather, climate, atmosphere** and **forecast**. The disciplinary knowledge gained in this unit allows the children to think more like meteorologists, using data and diagrams to deduce and draw logical conclusions.

The study of meteorology is connected to many elements of science, maths and technology. In 340 BCE, Aristotle (Greek philosopher), wrote the first major study into the Earth's atmosphere. However, many of his ideas were discredited because he did not believe it was necessary to make scientific observation. In the 1920s, Vilhelm Bjerknes, and other Norwegian meteorologists, developed the concepts of air masses after discovering how warm and cold air masses move and meet in patterns, this discovery was the building block for modern forecasting. The study of meteorology also brought great advances to military operations during World War I and World War II. The accuracy of gun fire and successful deployment of military pilot balloons and military aircrafts largely depended on wind speed, temperature and humidity (Met Office, 2014). Further information can be found here.

In our first lesson of this unit, the children will build upon prior knowledge to deepen their understanding of meteorology. In Year 1, the children were introduced to the concept of seasons and daily changes in the weather; they learnt that a meteorologist is a scientist who studies the weather. In this unit, the children will learn that meteorologists have the knowledge and skills to predict forecasts and to explain weather-related phenomenon. They will learn that

weather happens because our planet is wrapped in layers of air called the atmosphere. Our second lesson will focus on the ozone layer and how, in 1976, scientists discovered a hole in the ozone layer due to particular chemicals produced through man-made products. The children will learn that a worldwide agreement, called the Montreal Protocol, banned the production of ozone depleting chemicals, in 1987. Linking to the Year 5 unit of the 'Industrial Revolution', the children will learn that ozone levels have since risen in Northern Hemisphere, due to a rise in population and industrialisation (DEFRA, 2009). In our third lesson, the children will learn that the UK experiences six air masses which affect the weather, and that the UK's climate is called a maritime climate because it is largely influenced by the sea. In lesson four, the children will be introduced to warm and cold weather fronts. Finally, the children will learn how thunder and lightning is caused, and how we often see lightening before hearing thunder. This is because light travels faster than sound (as learnt in their Year 4 unit on Light).

Overall, this unit complements our overarching science curriculum aim, which is to enable children to understand the important role that science plays in the sustainability of life on Earth. And, as their substantive knowledge of concepts such as **weather** and **climate** progresses, the children will study how weather and climate effects people's lives, such as in the Geography unit on Africa when they study the impact of locust swarms on farmers in East Africa; and in the Year 6 'British Geographical Issues' unit, where the pupil will learn the impact climate change is having on the UK.

Lesson Sequencing:

In lesson one, pupils will learn how the atmosphere protects Earth and enables life. In lesson two, pupils will develop their knowledge of the atmosphere by looking at how human actions can impact it. Lesson three will explore the six air masses that affect the weather in the UK. This will be explored in greater depth in lesson four when pupils learn about weather fronts. In lesson five, pupils will develop their understanding of thunder and lightning as electrical charge that builds and moves through the atmosphere. In the assessment lesson, pupils will create a detailed weather report for the UK using what they have learnt from the unit.

Misconceptions:

- Meteorology is the study of meteors.
- Confusing thunder and lightning
- Clouds are made of water vapour.

Working Scientifically criteria met in this unit:

- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments