Lowerhouse Junior School
Science Overview Sheet

Year 4 – States of Matter

Rationale: Teaching States of Matter in Year 4 Science is vital for understanding the physical world. It introduces students to solids, liquids, and gases, and their properties. This foundational knowledge fosters scientific curiosity, critical thinking, and practical skills, helping students grasp more complex scientific concepts in the future.

Substantive Knowledge:

- Compare and group materials together, according to whether they are solids, liquids or gases
- Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Disciplinary Knowledge:

- Classifying
- Observing
- Comparative/Fair Testing

Overview:

Lesson 1: What are solids, liquids and gases?
Lesson 2 and 3: How can we classify materials?
Lesson 4: How can we change the states of materials?
Lesson 5: How do melting and boiling points change with different materials?
Lesson 6: What is evaporation and condensation?
Lesson 7: What are the stages of the water cycle?
Lesson 8: How can we create a model of the water cycle?
Lesson 9 and 10: TAPS investigation
Lesson 11: What have we learned about states of matter?

Key Vocabulary:

Solid: A state of matter characterized by particles arranged in a fixed, closely packed structure, giving it a definite shape and volume.
Liquid: A state of matter where particles are close together but can move freely, allowing it to take the shape of its container while maintaining a definite volume.
Gas: A state of matter where particles are far apart and move freely, filling the entire volume of its container and having no definite shape or volume.
Heating: The process of increasing the temperature of a substance, often causing a change in its state.
Cooling: The process of decreasing the temperature of a substance, often causing a change in its state.
State change: The transition of matter from one state to another, such as melting, freezing, evaporation, or condensation.
Melting: The process by which a solid turns into a liquid, usually when heated.
Freezing: The process by which a liquid turns into a solid, usually when cooled.
Melting point: The specific temperature at which a solid turns into a liquid.
Boiling: The rapid vaporization of a liquid, occurring when it is heated to its boiling point.
Boiling point: The specific temperature at which a liquid turns into a gas.
Evaporation: The process by which a liquid turns into a gas, usually at the surface and below the boiling point.
Condensation: The process by which a gas turns into a liquid, usually when cooled.
Temperature: A measure of the average kinetic energy of particles in a substance, determining how hot or cold it is.
Water cycle: The continuous movement of water on, above, and below the surface of the Earth, involving processes such as evaporation, condensation, precipitation, and collection.

Impact/Assessment

Most Children will be able to: • create a concept map, including arrows linking the key vocabulary • name properties of solids, liquids and gases • give everyday examples of melting and freezing • give everyday examples of evaporation and condensation • describe the water cycle • give reasons to justify why something is a solid liquid or gas • give examples of things that melt/freeze and how their melting points vary • From their observations,

give the melting points of some materials • Using their data, explain what affects how quickly a solid melts • measure temperatures using a thermometer • explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup • From their data, explain how to speed up or slow down evaporation • present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet