Sample 1 – Early Level – Specific Gravity

What's happening?

Children will experience how liquids with different densities will form layers.

Experiences and Outcomes and Related Benchmarks

SCN 0-15a - Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes.

- Justifies the selection of appropriate materials for different uses based on their physical properties.

SCN 0-07a - Through everyday experiences and play with a variety of toys and other objects, I can recognise simple types of forces and describe their effects.

- Demonstrates, through play, how a force can make an object stay still, start to move, speed up, slow down and change shape.

Pupil will learn:

- What density means.
- That gravity is a force that pulls down.
- That liquids with different densities form layers when poured gently into one another.

Resources Required

Long glass, Spoon, Syrup, Milk, Washing up liquid, Water, Veg oil, Rubbing alcohol (also known as isopropyl alcohol), Food colouring.

Introduction

Show the children all the resources for the experiment. Ask them if they can guess what they are going to do with them. Listen to the responses and acknowledge them. Tell them that they are going to make a multi-coloured experiment!

Development

Demonstrate to the children how the liquids can be layered up. They should be added to the glass in the following order – Syrup, Milk, Washing up liquid, water, vegetable oil, rubbing alcohol. Adding them carefully to the glass in this order will create a layered effect. Food colouring can be added to the colourless water and rubbing alcohol if desired. This could be pupil choice when they are trying for themselves. Ask pupils if they know why the liquids build up in layers instead of mixing. Listen to their answers and discuss them. Note down any key words they say, such as heavier, lighter, gravity, floating, sinking.

Don't yet share the answer. Include a table in a free play session where pupils can try to reproduce this layered mixture for themselves. Due to the inclusion of rubbing alcohol and washing up liquid the learning at the table must be teacher led as they are not safe to ingest. If this is not possible then the two liquids should be removed for safety reasons.

Whilst the pupils are playing they should be encouraged to try different things. What happens if they put the liquids in in a different order? What if they pour them quickly? What if they stir the layers? Note the pupils' answers.

Plenary

Come together as a class and ask the same questions again. Why do the liquids build up in layers? A simplified answer should be given. Gravity pulls the liquids down. Heavier liquids sink whilst lighter

liquids float on top. The correct word is density. More dense liquids are heavier, less dense liquids are lighter.

Assessment

The class teacher should use notes from the discussions during the introduction, from the free play session and from the plenary to assess pupil progress.

Differentiation

The learning should be differentiated through the use of questioning and by the suggested activities at the teacher led table.

Useful Questions

Q. What pulls the liquids down to the bottom of the glass?
A. Gravity pulls everything down, so it pulls the liquids too.

Q. Why do the liquids float one on top of the other?
A. One of the liquids is heavy and one is light. Gravity pulls the heavy one with more force, so it sinks further. The one that isn't as heavy, or is less dense, isn't pulled down as hard so it sits on top of the heavy one.

Q. What happens when we stir the liquids?
A. In the beginning it looks like they have all become the same colour, like they have mixed thoroughly. As they are left to sit, undisturbed they settle back into their layers.

Q. Can we use this in real life?
A. Yes, scientists do the same thing, but they have taps on the outside of the glass. They can open the tap and take out just one of the liquids.

Why teach this?

This introduces the children to the principle of density and the force of gravity. At this stage they should begin to use this vocabulary and later lessons in the pack will consolidate this.