

## States of Matter 物質狀態

### Does it Matter

Matter is all around us, it is contained in everything. Through this project, students learned to identify and describe the properties of matter, including flexibility, strength, transparency, hardness, size, color, weight, and texture. Students identified and explored three states of matter: solid, liquid, and gas. They learned that the properties of an object determine the task it can perform and discovered that some objects can serve a particular purpose better than others.

### Three States of Matter

In order to understand each state of matter, the students had to grasp the concept of matter. Identifying and describing solids was the easiest because they don't change shape and can be measured and weighed. Gasses are mostly invisible, but liquids can be manipulated and will take on the shape of their containers. During the course of the lesson, students made their own gas-filled balloons by combining liquids and solids, and they also participated in a hands-on activity that showed that objects can sometimes exist in two or three states at the same time.

### Design and Build

Using three states of matter, the students designed and made a toy to finish this fascinating learning experience. Their designs were based on solids, liquids, and gases provided in the box, and their creativity was amazing.

### 物質重要嗎

物質無所不在。透過此專題，學生學會分辨及描述物質的特性，包含延展性、力度、透明度、硬度、尺寸、顏色、重量、質地，以及三種物質狀態：固體、液體和氣體。他們了解一個物質的特性可決定其效用，並發現有些物質能更好地發揮某種作用。

### 物質的三種狀態

為了瞭解每一種物質狀態，學生必須先理解物質的概念。固體最容易被理解及描述，因為他們的形狀不會改變，且能被測量及秤重。氣體大多是不可見的，液體則是可被操作且能夠呈現容器的形狀。過程中，學生藉由結合液體及固體使氣球充滿氣體，並透過實作了解，有時一種物體可同時存在兩種或三種的物質狀態。

### 設計和建造

利用三種物質狀態，學生設計並製作玩具來完成這迷人的學習經驗。他們的設計材料基於箱子裡所提供的固體、液體以及氣體，並展現驚人的創作。

## 1 ASK + IMAGINE 提問 + 創思



Hands on activities helped us understand matter. 親手做活動讓我們更了解物質的特性。

## 3 PLAN 計畫



Applying our skills to design a toy made from all 3 states of matter. 運用我們的能力設計一款由三種物質狀態組成的玩具。

## 4 CREATE 創造



With creativity and collaboration we completed our toys. 我們運用創造力和互相合作，完成了我們的玩具。

## 5 IMPROVE 改進



Some design changes were needed if our plan didn't work out. 如果我們的計畫不成功，就需要對設計進行一些修改。