讓想像成為現實的魔法師——3D 列印

文/許地承

3D 列印(3D printing)又稱為增材製造(Additive Manufacturing)，是藉由 3D 建模軟體設計模型圖，再利用 3D 列印機將材料層層堆疊，最後形成物品的製造技術，舉凡醫療、教育、工業、建築、藝術等領域的產品，皆可透過 3D 列印機製造。目前國、高中的生活科技課，亦可見到 3D 列印的蹤影，是國內學生所熟悉、甚至親自操作過的設備，也是能將無限創意付諸實際的工業機器。

根據十二年國民基本教育課程綱要十九項議題中對「科技教育」的定義，旨在養成能觀察生活中的需求，並運用各式工具、材料，設計出可用的物品，培養學生「做、用、想」的能力。認識 3D 列印技術，可幫助學生將創意發想化為實物。在實際操作的過程中，學生也能從中習得建模、製造的知識和技能。

閱讀題組 “3D Printing” 以明確的 Introduction-Body-Conclusion 英文寫作架構開展，首先簡介 3D 列印的特色在於能使用各式各樣的材料，以經濟實惠的成本製造成品，可應用於許多產業，具有龐大的潛力。第二段詳述

3D 列印製作成品的過程，並特別指出 3D 列印可針對細節調整。最後文章以 3D 列印未來的展望作結，點出 3D 列印有望生產人工器官，造福需要器官移植的患者。本文期能在增廣學生科技知識同時，提升英文閱讀理解能力。

參考題組

3D printing

3D printing is an innovative technology that has the potential to revolutionize many industries. It entails creating a digital model and layering it with materials such as plastic, metal, ceramic, or even human tissue. One of the primary advantages of 3D printing is its cost-effectiveness, which makes it ideal for producing small batches of custom parts.

3D printing involves creating a digital model, either from scratch or from a pre-existing template, and then feeding the model's data to the 3D printer. The object is then printed layer by layer by the printer, which uses extrusion systems to deposit the material in a precise pattern, allowing for complex shapes and intricate details. Different materials can be used to make objects of varying sizes, textures, and colors, and the surface finish can be adjusted to create a wide range of aesthetic possibilities.

Overall, the versatility of 3D printing makes it suitable for creating a wide range of objects, from simple toys to complex medical devices. In the medical field, 3D printing has already been used to create customized prosthetics, implants, and other medical devices that meet the specific needs of patients. In the future, 3D printing may even be used to produce replacement organs and tissues, eliminating the need for organ transplants and allowing patients to receive tailor-made organs that match their unique requirements.

1. What materials can be used in 3D printing?
(A) Plastic and metal only
(B) Ceramic and human tissue only
(C) Any material that can be extruded in a precise pattern
(D) Only materials that can be printed with a smooth surface finish

2. What is the potential impact of 3D printing on organ transplants?
(A) Eliminating the need for organ transplants entirely
(B) Increasing the demand for organ transplants
(C) Reducing the wait time for organ transplants
(D) decreasing the demand for organ transplants

3. What is the primary advantage of using extrusion systems in 3D printing technology?
(A) Allows for the creation of more precise and complex shapes
(B) Reduces the cost of materials used in the printing process
(C) Shortens the time required for printing objects
(D) Improves the durability of 3D-printed objects

解析

1. What materials can be used in 3D printing? (C)
(A) Plastic and metal only
(B) Ceramic and human tissue only
(C) Any material that can be extruded in a precise pattern
(D) Only materials that can be printed with a smooth surface finish

文章提到 “Different materials can be used to make objects of varying sizes, textures, and colors, and the surface finish can be adjusted to create a wide range of aesthetic possibilities.” 說明 3D 列印技術可依據不同材料，製作出不同大小、紋理、顏色的物件。四個選項中，以(C) Any material that can be extruded in a precise pattern 所囊括的材料範圍最廣，故正確答案為(C)。

2. What is the potential impact of 3D printing on organ transplants? (C)
(A) Eliminating the need for organ transplants entirely
(B) Increasing the demand for organ transplants
(C) Reducing the wait time for organ transplants
(D) decreasing the demand for organ transplants

文章提到 3D 列印未來或許可以生產可供移植的人造器官，因此有助於降低接受器官移植患者的等待時間，故正確答案為(C)。(A)並未言及 3D 列印器官可以完全取代器官移植，(B)(D) 3D 列印雖可提供更多人造器官，但不能從根本上增加或減少需要器官移植的患者數量。

3. What is the primary advantage of using extrusion systems in 3D printing technology? (A)
(A) Allows for the creation of more precise and complex shapes
(B) Reduces the cost of materials used in the printing process
(C) Shortens the time required for printing objects
(D) Improves the durability of 3D-printed objects

文中第三段提到 “In the future, 3D printing may even be used to produce replacement organs and tissues, eliminating the need for organ transplants and allowing patients to receive tailor-made organs that match their unique requirements.”，說明隨著未來科技發展，3D 列印或許能應用於製造人體器官、組織，而且可根據個人需求量身打造(tailor-made)。與選項(A)所敘述 “Allows for the creation of more precise and complex shapes”，可以製造更精細、複雜的形狀相符，故正確答案為(A)。