高雄市新興區大同國民小學科學園遊會關卡說明

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GALACTIC ADVENTURE

國際雙語科學組｜地球科學類

設計理念

本關卡以宇宙探索為核心精神，結合擴增實境(AUGMENTED REALITY)、虛擬實境（VIRTUAL REALITY）及混合實境(MIXED REALITY)體驗結合關主雙語引導，設計一系列適合不同年段學生的太陽系八大行星闖關活動。

闖關說明

	AR 低年級	VR 中年級	MR 高年級
學習目標	學生能透過平板體驗太陽系八大行星的 AR 模型，正確認識並說出每個行星的名稱；同時藉由關主的導覽，了解行星命名的由來與背景，提升對太陽系的基本概念與興趣。	學生能透過VR頭盔進入沉浸式環境，近距離觀察太陽系八大行星的外觀特徵，辨識行星之間的差異，並能正確說出其名稱。透過虛擬體驗，培養學生對天文的興趣，增進其空間想像與觀察能力，並建立初步的太陽系整體概念。	學生能透過MR模式下進入沉浸式環境，將虛擬的太陽系八大行星投影於真實空間中，近距離觀察各行星的外觀特徵，並能辨識行星之間的差異與正確說出名稱。透過虛實融合的體驗，培養學生對天文的興趣，增進其空間想像與觀察能力，並建立初步的太陽系概念。
操作說明	1. 學生使用平板體驗太陽系八大行星AR，並從中認識每個行星的名稱。 2. 由關主介紹每個行星命名的故事。	1. 畫面切換：透過手把或頭部移動，選擇並切換觀察不同的行星與其排序。 2. 視角調整：轉動頭部即可改變觀看角度，放大或縮小行星，近距離觀察其外觀特徵。	1. 畫面互動：透過手勢或手把操作，將虛擬行星投影到真實空間中，並依需求切換不同行星或調整其排序位置。 2. 視角調整：學生可在教室中自由走動或轉動頭部，從不同角度觀看行星，並放大或縮小模型，以近距離觀察其外觀特徵。
問題思考	1. 八大行星的命名方式和其代表的意義。 2. 八大行星的外觀、顏色有什麼差異。	1. 觀察行星由內而外的排列，你發現距離太陽近的行星和遠的行星有什麼不同特徵？ 2. 如果太陽系中少了一顆行星，會對整體排列或運行造成什麼影響？	1. 你是如何根據描述判斷出是哪一顆行星的？哪些特徵最明顯？ 2. 如果把這些行星放在一起比較，你發現它們在大小、顏色或外觀上有什麼不同？
過關標準	透過平板完成太陽系八大行星雙語配對遊戲，全數配對完成即可過關。	透過平板完成太陽系八大行星順序排列遊戲，能依正確次序全部完成排列，即可視為過關。	學生能依據畫面中提供的描述，辨識對應的太陽系八大行星，完成名稱與特徵配對，藉此加深對行星外觀與差異的理解，並培養天文學習興趣。

TA-TUNG ELEMENTARY SCHOOL
INSTRUCTIONS FOR THE SCIENCE FAIR BOOTH

GALACTIC ADVENTURE

INTERNATIONAL BILINGUAL SCIENCE GROUP | EARTH SCIENCE

Design Concept

This booth centers on the spirit of space exploration, integrating Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) experiences. With bilingual guidance from the booth leader, a series of activities about the solar system’ s eight-planets has been designed to suit students of different grade levels.

Booth Instructions

	AR LOWER GRADES	VR MIDDLE GRADES	MR UPPER GRADES
Learning Objectives	Students will use tablets to experience AR models of the eight planets in the solar system, and correctly identify and name each planet. Through the booth leader’ s introduction, learn about the origins and background of their names. This enhances their basic understanding and interest in the solar system.	Students will enter an immersive environment using VR headsets to observe the appearance and features of the eight planets up close, distinguish the differences among them, and correctly name them. Through virtual experiences, they will cultivate interest in astronomy, enhance spatial imagination and observation skills, and build an initial overall concept of the solar system.	Students will enter an immersive environment in MR mode, projecting the virtual eight planets into real galactic space, observing them closely, distinguishing their differences, and naming them correctly. Through mixed reality, they will strengthen interest in astronomy, expand spatial imagination and observation, and build an overall concept of the solar system.
Instructions	1. Students use tablets to explore the AR solar system planets and learn their names. 2. The booth leader introduces the stories behind the naming of each planet.	1. Scene Switching: Use the controller or head movement to select and switch between planets and their order. 2. View Adjustment: Turn the head to change the angle, zoom in or out, and closely observe each planet’ s features.	1. Scene Interaction: Use gestures or controllers to project virtual planets into real space, switch between planets, or adjust their order. 2. View Adjustment: Students may walk around the classroom or turn their heads to observe planets from different angles, zooming in or out for close-up observation.
Thinking Questions	1. What do the naming methods of the eight planets mean? 2. What are the differences in appearance and color among the eight planets?	1. Observe the inner to outer planets, what differences do you notice between planets closer to the sun and those farther away? 2. If one planet were missing from the solar system, how would this affect its arrangement or orbit?	1. How did you identify the which planet based on the descriptions? Which features were the most obvious? 2. When comparing all these planets side by side, what differences did you notice in size, color, or appearance?
Passing Criteria	Students complete the bilingual matching game of the solar system’ s eight planets on the tablet. Full completion is required to pass.	Students complete the planet order arrangement game on the tablet. Full correct sequencing is required to pass.	Students identify planets based on given descriptions, match names with features, and complete the task to reinforce their understanding of planetary characteristics while developing interest in astronomy.