Hologram Zoo Teaching Guide – Years 9–10

Program Title: Light, Illusion & Innovation – The Science Behind 3D Experiences

Program Summary

In this advanced STEM excursion, students uncover the scientific and design principles that power the Hologram Zoo experience. They explore laser projection, 3D visualisation, optics, motion graphics, and perception. The program is ideal for deepening understanding of wave behaviour, light systems, and immersive display technologies while promoting critical thinking and creative problem-solving.

Connect – Pre-Visit Activities

- Review the physics of light: wavelength, frequency, wave model of light.
- Introduce the electromagnetic spectrum and polarisation concepts.
- Discuss how modern visual technologies create the illusion of depth and immersion (e.g., 3D glasses, VR, projection mapping).

Understand – On-Site Experience

- Students rotate through:
  • Technology Behind the Illusion – Detailed breakdown of the holographic display system, including how lasers, projectors, and polarisation interact.
  • Observation & Analysis – Focus on detecting visual effects, angles, and timing that produce realistic depth and motion.
  • Green Screen Production Session – Experiment with compositing, foreground/background perception, and lighting.
- Students engage with real-world examples of energy transfer, refraction, and lens design.

Act – Post-Visit Classroom Activities

- Construct ray diagrams showing how the system produces 3D illusions.
- Create a short technical presentation explaining one element of the projection system.
- Explore and compare historical vs. modern display technologies (e.g. Pepper's Ghost, AR, holography).
- Design an original concept for a STEM-based hologram learning experience.

Curriculum Links (Victorian Curriculum – Years 9–10)

- VCSSU133 – Energy transfer through different mediums can be explained using wave and particle models.
- VCSSU134 – The concept of the conservation of energy is used to explain energy transfers and transformations.
- VCSSU135 – The transmission of light and sound can be explained using wave models.
- VCSIS140 – Communicate scientific ideas and information for a particular purpose using appropriate language.
- VCDTCD050 – Investigate the role of emerging technologies in designing solutions to real-world problems.
- VCDTDS046 – Develop, justify and evaluate design ideas using criteria for success, sustainability, and innovation.

STEM or Inquiry Extensions

- Build a miniature optical system using mirrors and lenses.
- Model energy loss and light diffusion across different surfaces.
- Host a class showcase on 'The Science Behind Visual Illusion' with prototypes or storyboards.

Teacher Reflection

Reflect on student engagement with real-world STEM principles, technical communication, and their ability to connect theory with immersive media systems.