Lumination

Lesson Plan

AR & VR LESSON PLAN

Glass of the Future

Learning Area	Science	Kit	VR/AR Education Kit
Year Level	Years 7 & 8	Duration	45-60 mins

Introduction/Description	Glass is an imperative part of our everyday lives. But, what if we could enhance its use through technology?
	Many technologies around us use glass: From tablet screens and televisions to solar panels and optical cabling. It is from this advancing technology that we can continue to enjoy a more connected and sustainable future.
	This lesson addresses the following points in the Australian Curriculum:
	<u>Science as a Human Endeavour</u> ● Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE120, ACSHE135)
	This lesson may be used as a starting point in thinking about human innovation in science or as a concluding lesson in a unit.
Task Summary	Students will create and design an invention or an innovation on an existing product using glass technology after viewing different future uses of glass. They will create their prototypes using Tinkercad and CoSpaces.
Preparation	Students are expected to: ● Have some background in viewing YouTube videos in VR on the HHVR headsets. ● Have background experience in creating content using CoSpaces and TinkerCad.
	Teachers should make sure that: ● Devices are charged. ● Students are able to access YouTube videos. ● Students are divided into pairs or groups depending on how many devices are available. ● Slide deck has been checked and the teacher has enabled the

deck's accessibility so students can access them.
- A copy of the Student Digital Notebook has been distributed to students and they have downloaded/made a copy for themselves.

Resources

Hardware
- Student laptops
- Handheld Virtual Reality (HHVR) Headsets
- Mobile device

Tasks/ Presentations
- Glass of the Future: Presentation Notes (slide deck)
- Glass of the Future: Student Digital Notebook
- CoSpaces Example: Glass of the Future CoSpaces EDU (VR creation tool)
- Tinkercad (3D design tool)
- Importing a Tinkercad Model into CoSpaces (step by step guide)

Websites
- Corning Emerging Innovations
  Connecting our extraordinary materials and process capabilities to new market opportunities to create emerging glass innovations that lead to new products and businesses.
- Corning Interior Architecture
  Corning Glass for Interior Architecture helps designers, manufacturers, and building owners combine elegant aesthetics with practical, high-tech functionality.
- Corning Willow Glass
  Willow Glass is ultra-thin, lightweight & conformable. It is a perfect hermetic barrier that protects sensitive materials from moisture, oxygen, and staining.
- Corning Light Diffusing Fiber
  This innovative optical fiber was created from a unique glass for maximum flexibility — allowing you to bend, curve and wrap it around almost anything, while maintaining bright, beautiful and uniform light.

AR Experiences
- Corning Glass Museum (Google Arts and Culture)
  The Corning Museum of Glass is the foremost authority on the art, history, science, and design of glass. It is home to the world's most important collection of glass, including the finest examples of glassmaking spanning 3,500 years.
- ARC Glass Factory (Virtual Tour)
  Arc was founded in the North of France in Arques, which is still home to the Group's head office, its Research and Development division and the world's largest glass-production plant. This is a virtual tour of the facility in Arques, France.

Videos
- A Day Made of Glass 2 (5:58)
  A video showing Corning's expanded vision for the future of glass technologies. This video continues the story of how highly engineered glass, with companion technologies, will help shape our world.

Learning Sequence

1 (5-10 mins)

Introduction
- Introduce the following concepts through a class discussion:
  - Simple ideas can sometimes be quite complex; and
  - We can use everyday objects to build on and innovate with.

- Ask students to list where we would find glass in our everyday lives in their Student Digital Notebook. What are the different ways we use glass?

2 (35-40 mins)

Development
- Continue this brainstorming as students view the following AR experiences on the mobile devices:
  - Corning Glass Museum
  - ARC Glass Factory.

- Students can take notes from their AR experiences by completing a Connect-Extend-Challenge.

- Watch *A Day Made of Glass 2* (5:58) video. After viewing the video, ask students to complete the *see* part of the *see-think-wonder*. Give students time to complete the *Think-Wonder* part after the video.

- Direct students to choose five (5) glass items from their list and ask them to think-pair-share about how each chosen glass item might be adapted in the future in conjunction with technology. What ideas might they have? Encourage creativity and out of the box thinking!

- Ask students to begin brainstorming in pairs/groups of three. Ask questions such as:
  - What could they invent/adapt with glass technology?
  - How could they use glass technology in a new way?

- Direct students to the websites provided on their slide deck for more information on different ways glass is being used in technology to help with their designs and ideas.

- Students are to create a prototype of their design/idea in Tinkercad and CoSpaces. They may create a narrative around someone using the invention in CoSpaces.
  Steps on how to import a Tinkercad Model into CoSpaces.

3 (5-10 mins)

Conclusion
- Ask students to share their designs in CoSpaces by displaying the QR codes on their screens. Students may view each other's inventions and CoSpaces through their handheld virtual reality (HHVR) headsets.

Adaptation Ideas

- Students may recreate one of the technologies viewed in the Corning video and discuss its application instead of creating their own invention.

Extension Ideas

- Students may research further into specific forms of glass technology to specify in their designs, such as:
    - safety glass
    - solar panels
    - optical fiber
    - car windshields
    - airplane windows
    - electrochromic glass
    - deep sea submersible portholes
    - Gorilla Glass in phones
    - Xensation Flex foldable glass
    - glass on the International Space Station
    - vials for transporting the COVID-19 vaccine.

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