VR LEARNING TASK

Cosmic Archaeology: The Age of the Universe

Learning area
Science – Earth and space sciences

Year level
Year 10

Duration
90 -120 minutes (1 or 2 sessions)

Task summary

Students will experience and learn about the features and scale of the universe through research and a HHVR experience, which will enable them to explore cosmic facts in an immersive manner.

Session overview

Students will identify features of the universe as well as name at least three facts about the cosmos from their HHVR experiences. They will share their knowledge through a digital notebook and research the Big Bang theory.

Digital technologies

- ✓ VR
- ☐ AR
- ☐ Robotics
- ☐ Drones
- ☐ Other: _____

Required resources

Hardware:

- Whiteboard / Smartboard screen - For viewing slide decks, lessons, and videos.
- Handheld Virtual Reality (HHVR) headsets
- Headphones
- Devices
- Laptops / tablets

Apps:

- Microsoft Whiteboard - An online collaboration tool for sharing and brainstorming ideas as a group or class.

Videos:

- Archaeology of Light - 360°(21:43) - A 20-minute VR movie that starts from Earth and charts out a voyage throughout the various scales of the universe, from our solar system,

to the Milky Way, all the way to the cosmic web and the relic light of the Big Bang. It is a VR experience designed by astrophysicists using real scientific data.
Note: Students will only be watching from 5.25 - 12.38 which covers the Solar System and Milky Way Galaxy.

- The Most Astounding Fact - Neil deGrasse Tyson (3:34) - Astrophysicist Dr. Neil DeGrasse Tyson was asked in an interview with TIME magazine, "What is the most astounding fact you can share with us about the Universe?" This is his answer.
- Red shift | Astrophysics | Physics | FuseSchool(3:32) - A short video which explains the concept of red shift.
- What is the Cosmic Microwave Background? (7:35) - Dr. Don Lincoln explains how the Cosmic Microwave Background came to be.

Teaching resources:

- Teaching deck – this is a slide deck template that teachers can download and use for this learning task.
- Student digital notebook – to be distributed either in printed format or digitally via email or school learning management system.

Other resources to try (optional)

Miscellaneous:
VR/AR Safety Poster (PDF)

Planning and preparation

NOTE: This learning task may be introduced in the middle or at the end of the unit.

Assumptions
Students should:

- Be familiar with some general concepts of Earth and space sciences (e.g. light-years, telescopes, etc.).
- Know how to operate VR devices independently and use digital notebooks and collaboration boards like Microsoft Whiteboard.

Additional preparation for teachers

- Make sure that all devices are fully charged and are in working order.
- Check that all apps have been installed, updated, and are working properly on devices.
- Assign students to small working groups.
- Make sure students have their own copy of the Cosmic Archaeology Digital Notebook (Download via Microsoft PowerPoint OR Google Slides).

Developed by Shai Coggins & Vicki Mennillo

Task Sequence

1

Introductory activity / Provocation
(10 mins)

Brainstorm with students “What You Know About The Universe” and ask students to contribute at least one thing they know about the universe.

Tell students that they will be exploring facts about the universe today using the Handheld Virtual Reality (HHVR) headsets.

They will need to take note of some astounding facts that they learn about during their immersive experiences.

2

Prior knowledge check
(5- 10 mins)

Refer back to the collaboration board and facilitate a discussion with students based on the knowledge shared on the collaboration board..

- What are some things we know about the universe?
- What would we like to find out?

3

Activities
(60 mins)

1. Students will use the HHVR headsets to view two parts of the VR video, Archaeology of Light 360’ (21.42) and reflect on their experience using the prompting questions on slide 5 of the student digital notebook. Students will view from 5:25 to 12:38 , this will cover the Solar System and Milky Way Galaxy.

2. Students watch this video of astrophysicist Dr Neil DeGrasse Tyson The Most Astounding Fact - Neil deGrasse Tyson about his answer to the same question that the students answered in their VR creations, The Most Astounding Fact (3:35) and fill in the discussion question on slide 8.

3. Using the videos on slide 9 of the student digital notebook, students research and reflect on their understanding of the Big Bang theory guided by the research questions on slide 10-12 on the student digital notebook.

4

Check for understanding
(10 mins)

Class discussion/sharing: Ask students to share some of their experiences and/or responses from their student digital notebook to see if they can share their understanding of what they explored in the Universe.

If using the task as part of an assessment, teachers may opt to mark the student digital notebook responses.

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Differentiation for students with additional needs	Extension ideas	Video tips
Some students may want to work in pairs to complete their digital notebooks.	As an extension or additional activity, students can turn their research of the Big Bang theory into a timeline diagram illustrating the key events and stages in the history of the Universe according to the Big Bang Theory.	The video runs through the steps in this learning task.

Curriculum Connections

Australian Curriculum Version 9.0

Year 10 - Science
Describe how the big bang theory models the origin and evolution of the universe and analyse the supporting evidence for the theory (AC9S10U03)

Cross-curriculum priorities

- ☐ Aboriginal and Torres Strait Islander Histories and Cultures
- ☐ Asia and Australia's Engagement with Asia
- ☐ Sustainability

General capabilities

- ☐ Literacy
- ☐ Numeracy
- ✓ Digital Literacy
- ✓ Critical and creative thinking
- ☐ Personal and social capability
- ☐ Ethical understanding
- ☐ Intercultural understanding

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