| VR LEARNING TASK  Science Influencers: Waste Systems | Learning area |
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| Science |
| Year level |
| Year 7 |
| Duration |
| 90 minutes |

| Task summary  In this lesson, students can explore the current waste management systems using VR technology, and learn how science is consistently addressing societal issues. |
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| Session overview | Students will learn the role science has played in creating community policies and regulation, such as separating household waste and other recycling initiatives, and see how scientists aim for ongoing research and improvement for our society. |
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| Digital technologies | * VR * AR * Robotics * Drones * Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Required resources | For detailed information on how to access the apps mentioned in this learning task, please visit the edSpark apps page <insert link>.  **Hardware:**   * Immersive Virtual Reality (IMVR) headsets * Handheld Virtual Reality headsets (HHVR) * Android Devices * Laptops/ Tablets * Headphones   **Videos:**   * [Have Australian scientists discovered a recycling solution to our plastic problem? | 7.30](https://youtu.be/MTgentcfzgg?feature=shared)(5.11) - Talks about the struggles that the recycling industries are currently facing. Helps students understand that not all materials that are recycled will be reused.   **IMVR Apps:**   * [**Trash Time**](https://store.steampowered.com/app/1029110/Trash_Time/) - Trash Time is a virtual reality game that shows students how to recycle in a fun way, and understand that burning trash creates CO2 gas.   **VR Videos**:   * [From Your Recycle Bin to China: 360 Recycling Plant Tour](https://www.youtube.com/watch?v=5cn5sucdW84)(3:47) - a 360° tour of a recycling centre to see what happens to our recyclable waste and how we can be more eco-friendly consumers. * [Aberdeen recycling and resource facility | Altens East | 360 walk-through](https://www.youtube.com/watch?v=C6XhtWgWQXQ)(10:55) - a more indepth video of the recycling process, starting from the curbside collection, all the way to shipping and distribution.   **Websites:**   * [**KESAB Interactive Recycle Game**](https://www.kesab.asn.au/stuff/interactive/) - A fun, interactive and educational way for students to learn about the correct disposal of common household items.   **Teaching resources**:   * <placeholder link for 23 - Teaching Deck> - This is a slide deck template that teachers can download and use for this learning task. * <placeholder link for 23 - Student Digital Notebook> - To be distributed either in printed format or digitally via email or school learning management system. |
| Other resources to try (optional) | For detailed information on how to access the apps mentioned in this learning task, please visit the edSpark apps page <insert link>.  **Miscellaneous:**   * [VR/AR Safety Poster](https://drive.google.com/file/d/1vMsHdVpuF-DnnHzKcPd3-yFeMyBEpmNs/view?usp=sharing) (PDF) |
| Planning and preparation | **Assumptions**  Students should:   * Be familiar with general concepts of materials and waste management. * Have some skills and knowledge in using IMVR and HHVR headsets, and know how to navigate within an experience.   **Additional preparation for teachers**   * Make sure that the IMVR experience, Trash Time, has been downloaded on all learning stations. * Make sure that HHVR devices have the necessary apps installed. A YouTube video viewer is required for watching VR videos, so it’s important that YouTube is allowed on the school network. * Teachers should watch the VR videos and test the IMVR experience in advance to make sure that they are appropriate for their respective classes. * Ideally, students would have one HHVR headset and one Android device each. But, if there's a limited number of HHVR headsets and devices, students may be put in pairs and share devices to take notes. * Make sure all devices are fully charged and set-up appropriately before the lesson, with all apps installed and working. * Make sure that all students have a copy of the student digital notebook either in printed format or digitally via email or school learning management system. * Place students in 3 groups, and pair them up. * VR videos include informative audio, therefore it is advised to ensure students have their own headphones. |

# Task sequence

| 1 Introductory activity / Provocation (5mins) | | Display slide 2 of the <placeholder link for 23 - Teaching Deck> and introduce the lesson by watching the ABC News video on recycled materials[Have Australian scientists discovered a recycling solution to our plastic problem? | 7.30](https://youtu.be/MTgentcfzgg) (4:52). |
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| 2 Prior knowledge check (5 - 10 mins) | | Gather students’ prior knowledge and thoughts on the matter by holding a class discussion on the following questions:   * What was Dr Humphrey’s solution to all our unrecyclable materials? * What do you know, or were surprised to find out about recycled materials? * How does your family collect and sort your recycled materials? * How well do you think our school deals with recycled materials? |
| 3 Activities  (20 mins per rotation + 3 minute transition times) | | Use slide 4 of the teaching deck to explain how today’s lesson will consist of three stations. Students will be working in pairs, and will be given a couple of minutes to move to the next station after every 20 minutes.  Use the next four slides to explain each station and what would be expected of students. Students also have a copy of the station explanations in their <placeholder link for 21 - Student Digital Notebook> for later reference.  **Station 1: IMVR**  Students will work in partners, 10 minutes each, to practise their recycling skills under time strains. Students need to recycle as efficiently as they can to prevent the CO2 levels from reaching toxic levels. Deck instructions read:   * Take turns with your partner to sort the trash before it reaches the incinerator and creates unnecessary carbon dioxide! * Earn coins by recycling in the correct bins. * Use your money to buy power ups to help you recycle more efficiently. * Keep an eye on the CO2 metre, and make sure it doesn’t reach toxic levels!   **Station 2: HHVR/Reflection**  Students have two videos to view at this station. They will require their headphones or a quiet space to listen to the audio.  **VR video 1:** [From Your Recycle Bin to China: 360 Recycling Plant Tour](https://www.youtube.com/watch?v=5cn5sucdW84) (3:47) to watch, listen to the factual audio and answer the following questions in their student digital notebook:   * What were you surprised to see at the recycling plant? * What fact did you hear that you will most remember? * What does being a ‘smart consumer’ mean to you? * What idea do you have to improve the sorting method of recycled materials?   **VR video 2:** [Aberdeen recycling and resource facility | Altens East | 360 walk-through](https://www.youtube.com/watch?v=C6XhtWgWQXQ) (10:55) This video is longer and shows the steps of sorting recyclable materials in more depth. Students can view each step and fast forward as needed. No audio in this video, so headphones are not required; instead they must look around and read facts that pop up. Students to answer the following in their student digital notebook:   * Write down the steps involved in sorting and gathering recycled materials. * How would you feel about working in a recycling plant? * Should we have more bins at home so every household separates their own recycled materials? Why, why not, and what should the bins be? * What are your thoughts on recycling now?   **Station 3: Recycling Game**  In this station, students will use the [Recycling Stuff at Home](https://www.kesab.asn.au/stuff/interactive/) game to test their knowledge on the correct use of collection bins. They can read descriptions on an item, decide which bin to place it in and learn why or why not it belongs in a certain collection. There are 5 rooms for students to clean out. |
| 4 Check for understanding  (10 minutes) | | Using slide 9 of the teaching deck, wrap up the lesson with some reflection questions.   * What are your thoughts now on recycling and recyclable materials? * What do you think we can do better as a school to help this issue? * What can you do at home to be a ‘smart consumer’? * How can we inform others of this issue? |

| Differentiation for students with additional needs | Extension ideas | Video tips |
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| Students who cannot access IMVR experiences can support others in the experience or be given their own ‘trash sorting’ task.  Students can record their responses using audio or ‘speech to text’ functions. | Students can create a new recycling initiative to propose to their school as a way to best recycle /reuse rubbish at their school.  Students can create a 360° tour on CoSpaces or ThingLink where they show and explain the recycling procedures at their school. [Example of a simple tour.](https://edu.cospaces.io/BJU-JTX) | The video for this learning task runs through the IMVR app: Trash Time, and explains what students need to know to maximise their 10-minute session. |

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# Curriculum connections

| Australian Curriculum Version 9.0 | **Year 7 - Science** Explore the role of science communication in informing individual viewpoints and community policies and regulations (AC9S7H04)  *Elaboration:*  *Investigating how science communicates the impact of waste materials on the environment has led to the adoption of community policies for separating household waste and encouraged other recycling initiatives.* |
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| 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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