

VR & AR LEARNING TASK

## Cells in Focus

**Learning area**  
Science

**Year level**  
Year 8

**Duration**  
Session 1: 60 minutes  
Session 2: (optional) 60 to 90 minutes

### Task summary

The primary task aims to give students the opportunity to explore and 'zoom in' on a plant and an animal cell using Virtual Reality (VR) to understand the scale of cells. The secondary task enables students to design a physical or digital model of a cell in a three-dimensional format and explain how the representation models the cell.

### Session overview

**Session 1:** Students can recognise and understand the scale of a plant and an animal cell using Virtual Reality (VR).

**Session 2 (optional):** Students can identify and create a model of a cell in a three-dimensional (3D) format and explain their representation.

### Digital technologies

- VR
- AR
- Robotics
- Drones
- Other: \_\_\_\_\_

### Required resources

**Hardware:**

- Handheld VR headsets (HHVR)
- Devices

**VR videos:**

- [Virtual Plant Cell: Cell Explore, 2018. VPC 360° video by Plant Energy Biology \(5:58\)](#)
- [Chapter 1: Introduction to the Animal Cell \(5:31\)](#)

**Suggested videos:**

- [Microscope View of Plant Cells \(0:31\)](#)
- [Mitosis in an animal cell Under the Microscope \(0:31\)](#)

# Learning task

## Apps:

- **YouTube** - This needs to be whitelisted and downloaded on your devices.
- For Session 2:
  - **Tinkercad** accounts - For creating 3D assets; and/or
  - **CoSpaces EDU** (Download via [Google Play](#) or [Apple App Store](#)) / [CoSpaces](#) accounts (Free or Pro\*)

## Teaching resources:

- [Teaching deck](#) – download a copy for your own use.
- [Student digital notebook](#) – download a copy and distribute it to students via email or learning management system.
- [Session 2 checklist](#) (docx) or [session 2 checklist](#) (PDF) - if proceeding with Session 2, teachers may use this as a checklist when marking the 3D cells modelling task.

## Other resources to try (optional)

### HHVR app:

- [Inside Cell VR](#) (via Google Play Store) - This needs to be whitelisted and downloaded on devices.
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### Digital 3D cell models:

- PowerPoint 3D models - students can use the 3D models on PowerPoint to view an animal and plant cell.

### Articles:

- [The Use of Virtual Reality in the Teaching of Challenging Concepts in Virology, Cell Culture and Molecular Biology](#)

### Miscellaneous:

- [VR/AR Safety Poster](#) (PDF)

### No Tech Creation:

- It's also possible to create a physical 3D plant or animal cell using materials like papier-mache, plasticine, clay, plastic bricks (Lego), foam craft balls, or edible materials (e.g., cake, fruits, etc).

## Planning and preparation

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

### Assumptions

For **session 1**, students should have...

- Prior lessons in the topic of 'Cells' in the sub-strand of biological sciences. Preferably, they have been able to view cells under a microscope in the lab. If not, make sure to watch a relevant video. Suggested videos:
  - [Microscope View of Plant Cells](#) (0:31)
  - [Mitosis in an animal cell Under the Microscope](#)(0:31)
- Familiarity with the use of VR devices (HHVR).

For **session 2**, students should have the following if they're building a digital 3D model...

- Basic CoSpaces building skills for AR/VR experiences. Make sure to allocate 1 to 2 lessons to introduce CoSpaces if students have no background with the tool.
- Basic Tinkercad building skills for creating additional 3D assets. Otherwise, allocate at least 1 lesson to introduce Tinkercad skills.

- CoSpaces accounts (Free or Paid)
- Tinkercad accounts (Free)

If students are building a physical model, they should have access to materials like papier-mache, plasticine, clay, plastic bricks (Lego), foam craft balls, or edible materials (e.g., cake, fruits, etc).

#### Additional preparations for teachers

- Make sure that HHVR devices have the necessary apps and videos installed.
- Teachers should watch the videos and/or test the VR apps/games in advance to make sure that they are appropriate for their respective classes and devices.
- Make sure all devices are fully charged and set-up appropriately before the lesson, with all apps installed and working.
- Download and distribute copies of the student digital notebook [https://docs.google.com/presentation/d/14xzvxWrP2hT\\_wEvFwjuXgfcRIEow0S\\_IJXeQQYyQIUc/edit?usp=sharing](https://docs.google.com/presentation/d/14xzvxWrP2hT_wEvFwjuXgfcRIEow0S_IJXeQQYyQIUc/edit?usp=sharing) to students via email or a learning management system.

## Task Sequence

# 1

### Introductory activity / Provocation (5 – 10 mins)

Using the teaching deck, show students an image of a cell.

Ask them if they recognise what it is. What type of cell is it? Can they identify the different parts of the cell and their functions?

# 2

### Prior knowledge check (5 – 10 mins)

If the class has prior experience of viewing cells under a microscope, discuss how different it is to viewing cells as an image like the one they just saw and viewing them under a microscope.

If they haven't had a chance to see cells under a microscope, show the class some relevant videos like [Microscope View of Plant Cells](#) (0:31) and [Mitosis in an animal cell Under the Microscope](#) (0:31) where students get to see what plant and animal cells look like when viewed in this manner. You can find the videos on Slides 3 & 4 of the teaching deck.

After the viewing, ask questions, such as:

- What was it like viewing plant and animal cells using a microscope? Are they able to visualise and understand the different parts and functions of cells better than if they've just seen a photo or illustration?

## 3

### Activities

(Session 1: 25 – 30 mins; Session 2: 60 – 90 mins)

#### Session 1: (25-30 mins)

1. Introduce the activities for each station in this learning task and get students to use their digital notebook to record their learning.

These are the suggested stations:

- **Station 1: Brainstorming station** - Ask students to complete the 'Think, Puzzle, Explore' page on their student digital notebook and focus on the topic of plant and animal cells.
  - What do they THINK they know about cells?
  - What are some things that PUZZLE them about cells? What questions do they have?
  - What and how will they EXPLORE what they are puzzled about?
- **Station 2: HHVR station** - Ask students to view the suggested VR videos and apps about cells. They can use the QR codes and/or links available in their digital notebooks. Make sure students respond to the questions and prompts in their notebooks.

*In the HHVR station:*

- Put students into pairs (*Student A and B*) and ensure they have their student digital notebook ready so they can both record information.
- *Student A* will view the following video [Virtual Plant Cell: Cell Explore, 2018](#). [VPC 360° video by Plant Energy Biology](#) in VR and describe what they can see to their partner. *Student A* should focus on the form and function of the organelles and vividly describe them to *Student B*.
- *Student B* should create a mind map on their digital notebook, starting with the organelles they see. They can then start branching out to include notes on each organelle's form and function.
- Students may pause the video, or go back as needed, to capture all the information.
- The form of each organelle should be captured through descriptive phrases on what it looks like.
- The function of organelles would be descriptive phrases around what it does.
- After students have finished making notes on plant organelles, students may swap over roles and repeat the process with

animal cells by viewing the [Chapter 1: Introduction to the Animal Cell](#) (5:31).

- **Station 3: Creation station** - Get students to draw an animal cell or plant cell from their memory or a reference image. Make sure to label each part and describe the function of the cell parts. They can use any drawing app like MS Paint or they can use traditional media (paper, pencils, etc). Teachers may opt to make this into a science drawing competition.

If you're using the **three** suggested stations, students can spend approximately 10 minutes per station. If you decide not to use Station 3 as part of the rotation, students can spend longer on each station.

If proceeding to session 2, get students to think about their AR/VR experiences and their earlier brainstorming session and tell students that they will be creating a 3D cell model using either digital or physical methods.

#### Session 2: (60 to 90 mins)

1. Teachers can show some student examples of their cell illustrations and/or organise a 'learning walk' where students get to look at everyone's illustrations.
2. Tell students that in this lesson, they can turn their 2D illustrations of cells into a 3D model. If building using physical tools, give students access to these tools. If building using a digital platform like CoSpaces and/or Tinkercad, give students some reminders on what you would like to see in their models (e.g., labels, interactive elements, etc).
3. Allow students time to build their 3D models. Teachers can also use this time to get students who haven't completed tasks from Session 1 to complete them.
4. Get students to share their 3D cells and share feedback.

## 4

### Check for understanding (5 - 10 minutes)

To conclude this learning task, teachers can ask students to submit their student digital notebooks via an online learning management system or email for assessment.

Teachers can also run the quick quiz at the end and use it as part of their assessment.

After **session 1**, teachers may also opt to hold a class discussion or get students to discuss within small groups the following questions:

- What was it like viewing cells in a VR environment?
- What's the difference between viewing cells using a textbook or other 2D environment, viewing cells under a microscope, and using VR?
- Which method of viewing cells do they prefer? Why?

For **session 2**, teachers may opt to use the session 2 checklist when marking students' 3D cell models.

Differentiation for students with additional needs	Extension ideas	Video tips
<p><b>Session 1:</b> Students may be more comfortable viewing the VR animation in a browser window on their device.</p> <p><b>Session 2:</b> If creating cell models digitally, students may be given the option to use pre-made 3D models on PowerPoint.</p>	<p>Students can investigate photosynthesis in greater detail to deepen their understanding of plant cells, and learn about the vital process that sustains a plant's life.</p> <p>Students can investigate/research how different cells work together to form tissues, organs or organ systems. This will help deepen their understanding of how cells work together.</p>	<p>The video for this learning task demonstrates how to load the plant and animal VR experiences using devices and HHVR headsets.</p>

## Curriculum Connections

### Australian Curriculum Version 9.0

#### Year 10 - Science

Recognise cells as the basic units of living things, compare plant and animal cells, and describe the functions of specialised cell structures and organelles (AC9S8U01)

### 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