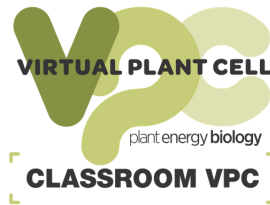
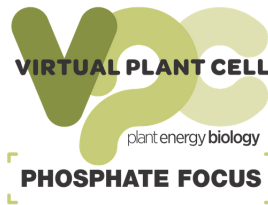
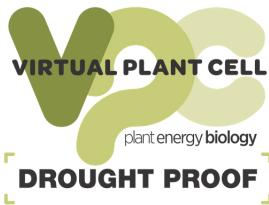
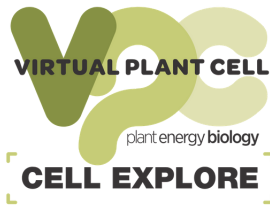


QUICK GUIDE: Virtual Plant Cell teaching resources



Click a logo above to link directly to resource.

WHAT IS THE VIRTUAL PLANT CELL?

The ARC Centre of Excellence in Plant Energy Biology (PEB) is a world leading, not-for-profit Australian plant research Centre. We focus on improving plants for productivity in changing environments to strengthen agriculture and our future food security. Our Education and Outreach program aims to create greater awareness of the importance of plants and better understanding of plant research. **Virtual Plant Cell (VPC)** is our ground-breaking suite of free, immersive, educational virtual reality resources that connect students with plant science and its application to real world challenges in an innovative, engaging and effective way. VPC presents curriculum-aligned science topics and links these to real world examples of STEM research and innovation. Learn more about VPC's educational value [here](#).

PEB performs its research and education/outreach activities out of four collaborating universities: The University of Western Australia; Australian National University; The University of Adelaide; and La Trobe University.

All of our free resources can be downloaded at:
plantenergy.edu.au/outreach/resources



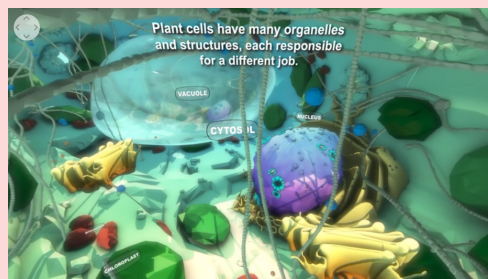
VIRTUAL PLANT CELL: CELL EXPLORE

Virtual Plant Cell: Cell Explore takes students through the sub-microscopic inner world of a plant so that they can learn about the key organelles and structures that make up plant cells.

Addresses topics including: Plant cell biology; structure of cell organelles and membranes; function of cell organelles and membranes; photosynthesis; energy production and usage in plant cells; plant and cell rigidity.

Resource package includes:

- VPC: Cell Explore 360° video
- VPC: Cell Explore, Resource Overview
- VPC: Cell Explore Teacher's Guide
- VPC: Cell Explore Student Worksheet
- Onion Cell Preparation Activity



Curriculum alignments: Senior Secondary Curriculum: Biology: Unit 2: Science Understanding: ACSBL044, ACSBL045, ACSBL049, ACSBL050, ACSBL052, ACSBL053. Lower school curriculum: Biological sciences: Science Understanding: Year 8: ACSSU149, ACSSU150.

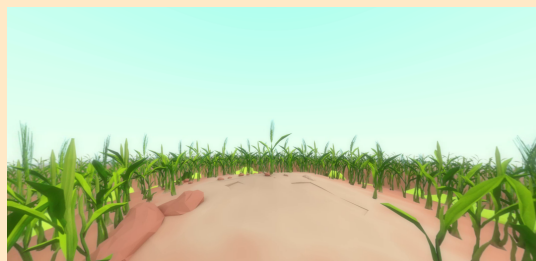
VIRTUAL PLANT CELL: DROUGHT PROOF

Virtual Plant Cell: Drought Proof showcases an Australian research effort to address the challenge of improving plant growth under drought conditions.

Addresses topics including: Organisms and the environment; adapting to stress; plants; drought, water and sunlight; plant cell biology; cell signalling; feedback loops; transcription and translation; photosynthesis; and food security.

Resource package includes:

- VPC: Drought Proof 360° video
- VPC: Drought Proof, Resource Overview
- VPC: Drought Proof, video transcript
- Research story: Lending Plants a Hand to Survive Drought
- Stomata peel activity
- DNA Extraction activity



Curriculum alignments: Senior Secondary Curriculum: Biology: Unit 2: Science Understanding: ACSBL044, ACSBL049, ACSBL050, ACSBL051, ACSBL052. Science as a Human Endeavour: ACSBL038, ACSBL039, ACSBL040, ACSBL043. Biology: Unit 4: Science Understanding: ACSBL115. Lower school curriculum: Biological sciences, Science Understanding: Year 9: ACSSU175. Year 8: ACSSU149, ACSSU150. Year 6: ACSSU094. Science as a Human Endeavour: Year 8: ACSHE134, ACSHE136.

VIRTUAL PLANT CELL: INTO AQUAPORINS

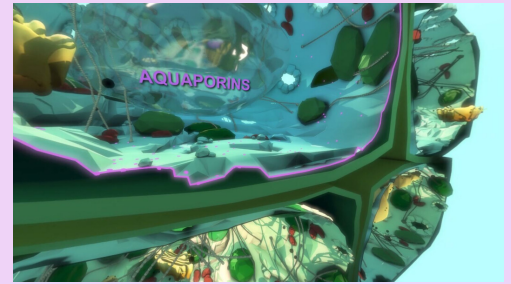
Virtual Plant Cell: Into Aquaporins highlights the important role that aquaporin proteins play in shuttling water, carbon dioxide and other molecules vital to good plant health, into and out of plant cells.

Addresses topics including: Plant cell biology; proteins and their functions; protein structure; diffusion across membranes; function of membranes; transcription; translation; photosynthesis; energy production in plant cells; and food security.

Resource package includes:

- VPC: Into Aquaporins 360° video
- VPC: Into Aquaporins Teacher Guide
- VPC: Into Aquaporins, video transcript

The VPC: *Into Aquaporins* video supports the **Planting Science: Classifying Systems in Cells** lesson plan developed by the ARC Centre of Excellence for Translational Photosynthesis. *Please refer to this lesson plan for curriculum alignments.*



VIRTUAL PLANT CELL: PHOSPHATE FOCUS

Virtual Plant Cell: Phosphate Focus highlights the importance of phosphate to plants, and showcases the ways research can help to improve plant phosphate use for agriculture.

Addresses topics including: Basic plant cell biology; nutrient and energy requirements of cells; organisms and their environments; adaptations to environments; and food security challenges.

Curriculum alignments: Senior Secondary Curriculum: Biology: Unit 2: Science Understanding: ACSBL044, ACSBL049, ACSBL050. Science as a Human Endeavour: ACSBL038, ACSBL039, ACSBL040, ACSBL043. Lower school curriculum: Biological sciences, Year 8, Science Understanding: ACSSU149, ACSSU150. Science as a Human Endeavour: ACSHE134, ACSHE136.

VIRTUAL PLANT CELL: CLASSROOM VPC

Interactive VR experience – Oculus Rift

Students explore, interact with and learn about the key organelles and structures found within a plant cell in this immersive, educational virtual reality experience.

Addresses topics including: Plant cell biology; structure of cell organelles and membranes; function of cell organelles and membranes; photosynthesis; energy production and usage in plant cells; plant and cell rigidity.

Virtual Plant Cell: Classroom VPC is suited to teaching Cell Biology at a Year 8 Australian Science Curriculum level. It can also be enjoyed by lower or higher year groups. The experience is designed to run as a TWO STUDENT educational interactive i.e.; a single headset wearer and collaborating stand-alongside partner(s) or class.

Resource includes:

- Virtual Plant Cell: Classroom VPC virtual reality experience for Oculus Rift
- Virtual Plant Cell: Classroom VPC user guide
- Virtual Plant Cell: Classroom VPC storyboard
- Plant cell modelling activity, inc. teacher guide and student worksheets.

Curriculum alignments: Senior Secondary Curriculum: Biology: Unit 2: Science Understanding: ACSBL044, ACSBL045, ACSBL049, ACSBL050, ACSBL052, ACSBL053. Lower school curriculum: Biological sciences: Science Understanding: Year 8: ACSSU149, ACSSU150.



plantenergy.edu.au/vpc Immerse. Explore. Learn.