






# Lesson plan – Year 8 science

## Unit 1, Lesson 15: Revision of cells

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This lesson plan was developed by Ochre Education and science teacher Darcie Clarke. It outlines her approach to teaching a Year 8 science lesson on revising cells.

-  [Watch the lesson video](#)
-  [Watch a video of Darcie talking about her teaching practices](#)
-  [View the science unit plan example](#)
-  [Download sample lesson plan template](#)
-  [View all other online lessons and supporting resources](#)

This lesson is part of a unit on [cells, tissues and organs](#). Ochre Education and the Australian Education Research Organisation (AERO) have published 15 online lessons (and supporting resources) that make up this unit. This is the first of the lessons in the unit – you can watch the lesson video [here](#) and you can watch a video of Darcie talking about her practice [here](#).

This lesson plan is a supplementary resource for this work. It includes guidance on how the lesson was structured and sequenced within the unit and can be used while interacting with the Ochre resources. The plan also allows teachers to see an example of planning for one lesson within a sequence of lessons and reflect on their own teaching and effective practice. The lesson plan is annotated to explicitly show some of the decisions that are made during the planning process

Another way to use this lesson plan is as a starting point for discussions with colleagues to build collective capacity for lesson and unit planning. Teachers can also use the lesson plan to reflect on their own planning for lessons and units and guide future planning. A blank lesson plan teachers can use and modify as a resource for their own planning can be accessed [here](#).

All the lessons from this unit can be accessed for free on either the [AERO](#) or [Ochre Education](#) websites.

## Definitions

### Learning objectives

Clear and easy to understand statements about what students are expected to be able to know, do and/or understand by the end of a period of instruction (not to be confused with the instructional tasks), and at what level this learning is to take place.

### Success criteria

A clear statement about the measure that will be used to prove whether, and how well, a student has met the learning objectives by the end of a period of instruction. Success criteria are observable actions that a student can perform to demonstrate their understanding of the learning objectives. It is important that these elements are observable – avoid using phrases like ‘students will understand that...’ as we can’t observe understanding. Instead, the criteria could be ‘students will write, say, make or do something that indicates understanding’.

### Tasks

Activities undertaken by students as part of the learning process. Carefully designed tasks can also assist students in mastering new knowledge or skills. Scaffolds and worked examples might be used to assist students with some tasks. Teachers can monitor their students’ ability to complete tasks as part of a formative assessment approach to help determine whether students have demonstrated the success criteria.

# Subject Science: Cells, tissues and organs

## Year level/Stage 8

### Lesson background

This is the fifteenth lesson in the cells, tissues and organs unit, which is the first unit undertaken in Year 8. It reviews the understanding built through each previous lesson in the unit.

This lesson background shows how the lesson is sequenced and positioned within the unit.

### Learning objectives

In this lesson, students will learn to:

- practice retrieval and application of skills and knowledge covered in previous lessons in the unit
- review concepts and provide an opportunity to review complex concepts, and address misconceptions and gaps in knowledge.

### Success criteria

By the end of this lesson, students will be able to:

- identify eukaryotic and prokaryotic cells from descriptions and images and justify this choice
- apply knowledge of specialised tissues to the efficiency of diffusion in the digestive or respiratory system
- explain the consequences of lacking specialised tissues on the role of the digestive or respiratory system.

The success criteria are a series of clear statements that will be used to prove whether, and how well, a student has met the learning objectives at the end of a period of instruction.

### Misconceptions

- Students may believe that prokaryotic cells lack only a nucleus, rather than lacking all membrane bound organelles.
- Students may believe that all eukaryotic cells look similar, and all prokaryotic cells look similar – there is not diversity within these two categories.
- Some students may believe that particle movement only occurs when a concentration gradient exists, and when concentration in a solution is even, particles are stationary.
- Another misconception is that when objects appear static, the particles within them possess no kinetic energy.

Misconceptions are incorrect knowledges and understandings that students have prior to the lesson, or may obtain during the lesson. Outlining these during planning can help with monitoring student learning, and recognising when corrective feedback is needed.

\* In this column, you will find prompting questions to guide your planning for each lesson stage.

\*\* In this column you will find prompting questions to consider when monitoring learning at each stage of the lesson.

Lesson stage*	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning**
<b>Review of previous learning</b>		
<p>How will you ensure that students have the prerequisite skills and knowledge to progress their learning in this lesson?</p> <p>How will you activate prior knowledge/help students retrieve relevant learning from previous lessons?</p>	<p>Run a quick introductory quiz to assess prior knowledge about the concepts covered in the unit so far. Focus is on activation of prior knowledge around prokaryotic and eukaryotic cells, and adaptations of systems, as well as identifying misconceptions around the process of diffusion.***</p> <ol style="list-style-type: none"> <li>1. Overview of keywords:                             <ol style="list-style-type: none"> <li>a. Eukaryote</li> <li>b. Prokaryote</li> <li>c. Cell</li> <li>d. Tissue</li> <li>e. Organ</li> <li>f. Diffusion</li> </ol> </li> </ol>	<p>How will you gather evidence that shows you where your students are at in their learning?</p>

\*\*\* This quiz acts as formative assessment to assess what students know and can do already. It can be done online, as a paper test or using mini whiteboards.

Formative assessment is particularly important in revision lessons. This is due to the large range of knowledge and skills learned in a unit. This quiz can be used to inform decisions on the concepts reviewed, depth of instruction, and time spent on each concept during the lesson.

The questions in this quiz will highlight key words to students (the first of repeat exposures) and will expose common misconceptions surrounding prokaryotic cells lacking a nucleus only, and the types of particles that can diffuse, and under what conditions they do so.

Lesson stage*	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning**
<p>(continued)</p> <p>How will you ensure that students have the prerequisite skills and knowledge to progress their learning in this lesson?</p> <p>How will you activate prior knowledge/help students retrieve relevant learning from previous lessons?</p>	<p>2. Opening questions and ideas:****</p> <ul style="list-style-type: none"> <li>a. The definition of a cell, and the distinction between prokaryotic and eukaryotic cells.</li> <li>b. The movement of particles and factors affecting their movement in diffusion.</li> <li>c. The adaptations present in human tissues and the function they serve.</li> </ul>	<p>(continued)</p> <p>How will you gather evidence that shows you where your students are at in their learning?</p>

\*\*\*\* The ideas included in the quiz are either key concepts of prior knowledge, or common misconceptions. As this is the first unit covered in Year 8, I am assuming a low level of prior knowledge.

Students must have an understanding of particles, as well as kinetic energy in order to understand diffusion. Without understanding what a particle is, students will find it challenging to explain their movement in the phenomenon of diffusion.

Some common misconceptions here are that particles are static, and that static objects do not possess any kinetic energy of particles. Both of these are assessed in the starter quiz so they can be addressed, in order to correctly integrate new information into student understanding.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
<b>Explicit teaching of new learning ('I do') – types of cells</b>		
<p>How will you communicate the learning objectives to students?</p> <p>How will you break down your content into sequential steps to avoid overloading your students' working memory?</p> <p>How will you model the learning to support student understanding?</p>	<p><b>Whole class:</b></p> <ol style="list-style-type: none"> <li>1. Read the learning objectives and success criteria to students, referencing back to them as they are encountered throughout the lesson.</li> <li>2. Read lesson structure and key words, so students can identify next steps in learning and important concepts throughout the lesson.*</li> <li>3. Explicit instruction of the concept of cells.**</li> </ol>	<p>How will you help students retrieve information learned in previous lessons, units?</p> <p>How will you check for understanding and correct any errors or misconceptions before moving onto guided practice?</p>

\* Students need to have an understanding of the scope and sequence of a lesson. This helps them to visualise the next steps for their learning, and to link work produced to achieving the success criteria.

It is also important in supporting the development of metacognitive skills around assessing their own understanding and abilities, recognising when support is needed, and knowing how to access it.

\*\* Students will come into this lesson with a preconceived idea of concepts covered based on prior understanding and life experiences.

This can be challenging when this pre-existing schema contains misconceptions, but is also a tool for learning.

Being able to connect unfamiliar concepts to an existing schema will mean students can learn more readily. They will also form a deeper understanding of the new concepts and their connections to other ideas.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
<p>(continued)</p> <p>How will you communicate the learning objectives to students?</p> <p>How will you break down your content into sequential steps to avoid overloading your students' working memory?</p> <p>How will you model the learning to support student understanding?</p>	<p>4. Introduce the 2 categories of cells. Use images and examples to explain the importance of 'membrane bound organelles' as opposed to containing a nucleus.***</p> <p>5. Complete a check for understanding**** on the concept of prokaryotic and eukaryotic cells.</p>	<p>(continued)</p> <p>How will you help students retrieve information learned in previous lessons, units?</p> <p>How will you check for understanding and correct any errors or misconceptions before moving onto guided practice?</p>

\*\*\* A common misconception here is that if a cell doesn't contain membrane bound organelles it must be prokaryotic. Asking targeted questions here, and introducing eukaryotic, nucleus-lacking examples such as red blood cells can help to identify and debunk this misconception.

\*\*\*\* The checks for understanding are an effective form of formative assessment. These questions are quick, and answers can be collected through online polls, holding up fingers, or mini whiteboards. This check for understanding allows me to determine if students know the difference between a prokaryotic and eukaryotic cell. I will only move on when a high level of success is achieved as this tells me that students are ready to learn the next concept. If many students are not able to answer this question correctly, I will review this concept further by explaining it and providing more examples, and then will ask them to complete a different check for understanding on the same concept.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
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**Guided practice ('We do') – categorising a cell as prokaryotic or eukaryotic**

<p>What worked examples will you provide students?</p> <p>What scaffolds and instructional supports will you introduce, and how will students use these?</p> <p>How will students work together to progress their skills and understanding?</p>	<p><b>Whole class:</b></p> <ol style="list-style-type: none"> <li>1. Show students the question, breaking it down* into the command and content words to be focussed on.</li> <li>2. Verbally describe the image** to be analysed, pointing out key features to be considered.</li> <li>3. Provide students with the option to work ahead and attempt this problem on their own if they have demonstrated a high level of understanding so far.***</li> <li>4. Encouragement to complete the independent practice task that follows in the 'you do' phase. Emphasise the presence of the 'challenge' question.</li> </ol>	<p>How will you check for understanding and correct any errors or misconceptions before allowing students to independently practice?</p>
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\* Chunking a question with several parts into smaller, discrete skills helps to reduce the cognitive load of students by letting them focus on one thing at a time.

Mastery learning can apply to skills as well as concepts. Students are able to demonstrate they can 'identify', even if they might not be able to 'explain' their choice at this stage in their learning. This helps them to identify where they are at in their learning.

\*\* Often in biology, especially when learning about cells, student can be overwhelmed when looking at unfamiliar images or diagrams, and can be unsure as to what they are looking for or focusing on.

Modelling your thought process provides students with a step by step process for answering similar types of questions.

\*\*\* This can be determined through checks for understanding, as well as frequent questioning as dialogue during the explicit teaching phase of this lesson.

Not every student will need the same level of modelling before they are ready to attempt independent practice. This allows students with a higher level of understanding to gain more independent practice, which is important for mastery of a concept.

In the classroom, I would allow students to work ahead independently, while continuing at a slower pace to model the example for the majority of the class. The students who attempted independently can use the model to check their work.



Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
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**Independent practice ('You do') – categorising cells as prokaryotic or eukaryotic**

<p>How will students display that they have mastered the skills and content?</p> <p>How will you work with students to provide support and to gain insight into their learning?</p>	<p><b>Individual:</b> All students are encouraged to complete worksheet task 1 independently. Students who grasped the worked example easily can complete the 'challenge' task.*</p> <p><b>Small groups:</b> For students who need more guided practice, gather them in a small group and work through one more example before they have the opportunity to work independently.**</p> <p><b>Whole class:</b> Explain the answers to the independent tasks. Highlight common errors that may have been present, and explain choices made to achieve the correct answer.</p>	<p>What formative assessment will you gather to provide feedback to your students?</p>
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\* The challenge task which requires a higher order of thinking around the same concept. The 'challenge' task also allows extra practice for students who complete worksheet task 1 and require repeated attempts to consolidate understanding.

\*\* Providing multiple scaffolds before independent practice means every student can demonstrate they understand the concept and the procedure before attempting it on their own. This is a key step in ensuring mastery of a concept, as you can make sure students have the knowledge and skills needed before completing the independent task.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
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**Explicit teaching of new learning ('I do') – specialisation of cells, tissues and organs**

	<p><b>Whole class:</b></p> <ol style="list-style-type: none"> <li>1. A quick review of cells, tissues, organs and organ systems. Explain the images as examples. Ask questions here to help students connect the example to the definition (What organs can be found in the digestive system? What roles do they have? Are these the same or different? What common purpose do they work together to perform?)</li> <li>2. Complete a check for understanding before moving on to the next concept.</li> <li>3. Explicit instruction of the concept of specialisation. Ask students to consider the cells shown. What do they notice about the structure? What job do these cells perform? How does their structure help them to perform this role?*</li> <li>4. Explain the process of diffusion, the role of the digestive system, and the villi, which link these 2 concepts.**</li> <li>5. Complete a check for understanding.</li> <li>6. Explain the role and adaptations of the respiratory system, then complete a check for understanding.</li> </ol>	
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\* Every class will vary with their prior knowledge and level of understanding. Simple observational questions will be appropriate for most students, however depending on the stage of their learning, some of the answers to these questions may be provided; for example, the role of the cells, as a scaffold to help them connect structure and function.

\*\* These are concepts which were covered in previous lessons, so time spent explicitly teaching these will likely be brief, to maximise time spent actively practicing application through independent learning tasks. This is a good opportunity to review any common areas of confusion or misconceptions that arose in the previous teaching of these concepts.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
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**Independent practice ('You do') – explain factors affecting diffusion in the body**

	<p><b>Independent:</b> Explain the task and emphasise that students may choose to answer questions on either the respiratory or digestive system.*</p> <ul style="list-style-type: none"> <li>– Students who need extension can attempt both sets of questions – communicate this option to students.</li> </ul> <p><b>Small groups:</b> For students who need more guided practice, gather them in a small group and work through one more example before they have the opportunity to work independently.**</p> <p><b>Whole class:</b> Explain the answers to the independent task. Highlight common errors that may have been present, and explain choices made to achieve the correct answer.</p>	
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\* This option provides differentiation as students are required to apply the same skills, but can choose the context that they are most comfortable with. This supports students on focusing on the skills of applying knowledge if they are developing their knowledge, and provides a challenge for students who want to choose a context they are less confident in.

\*\* As this is a revision lesson, students have had prior opportunity to develop the required knowledge and skills in this unit. This lesson should not be reteaching these, but reviewing the more difficult concepts and common misconceptions and then practicing retrieval and application of knowledge.  
Students who need extra support may benefit from an extra layer of guided practice prior to independent practice. This step allows for these students to be considered, while more capable students can move straight into independent practice.

Lesson stage	Instructional activities What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
<b>Lesson summary</b>		
<p>How will you show students how far they have come in the lesson?</p> <p>How will you review their learning?</p> <p>How will you help students reflect on, or summarise the most important parts of their learning?</p>	<ol style="list-style-type: none"> <li>1. Review the success criteria from the lesson, pointing to specific skills the students will have demonstrated.*</li> <li>2. Use the <a href="#">exit quiz</a> to get a sense of what students know and are able to do as a result of the lesson.**</li> </ol>	<p>What evidence will you gather from your students to understand what you may need to review next lesson?</p>

\* This is an important step. It promotes the critical skill for students of reviewing and regulating their own learning- did I complete all the learning tasks? Did I achieve the success criteria for today? Is there anything I need to review before next lesson?

\*\* The exit quiz is a formative assessment of whether students can demonstrate skills and understanding relating to the success criteria. It can be done in a range of ways: online, as a paper test, or using mini whiteboards. The quiz allows students to test their understanding of the concepts and also provides me with data as to what they have understood. Although this is the last lesson in the unit of learning, it can be used to guide future units, as well as inform students of their learning progress and achievement of success criteria during independent revision of the topic.