For school teachers

Lesson plan – Year 8 science

Unit 1, Lesson 11: To describe the digestive system

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 describing the digestive system.

- 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 eleventh lesson in the cells, tissues and organs unit, which is the first unit undertaken in Year 8. It applies the knowledge of the process of diffusion that has been covered earlier in this unit.

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

Learning objectives

In this lesson, students will learn to:

- describe the function and structure of the digestive system
- understand the role of diffusion in the digestive system
- explain the purpose of adaptations in the digestive system.

Success criteria

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

- label a diagram of the key organs of the digestive system
- define and draw connections between key terms to do with the digestive system
- explain the consequences of lacking key adaptations in the digestive 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

- The digestive system as 'internal', rather than a tract that remains external to the body.
- Students have many misconceptions around the term digestion. These involve digestion being the process of eating only, digestion occurring in the stomach only, or not recognising absorption as a key process that occurs after digestion, rather than as part of it.
- Another common misconception is that urine is a form of waste generated by the digestive system.

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**
Review of previous learning		
How will you ensure that students have the prerequisite skills and knowledge to progress their learning in this lesson? How will you activate prior knowledge/help students retrieve relevant learning from previous lessons?	Run a quick introductory quiz to assess prior knowledge prior knowledge about digestion and the organisation of the human body into systems. Focus is on activation of prior knowledge around the process of digestion,*** as well as identifying misconceptions. 1. Overview of keywords: a. System b. Digestion 2. Opening questions and ideas: a. The definition of digestion. b. The definition of, and difference between, an organ and a system. c. The location of digestion and parts of the digestive system.	How will you gather evidence that shows you where your students are at in their learning?

*** This quiz acts as formative assessment to ascertain what students know and can do already.

It can be done online, as a paper test or using mini whiteboards.

This is particularly important for this topic as students typically have extensive knowledge coming into the lesson around food and digestion. The colloquial use of digestion in everyday language can also lead to an array of incorrect understandings about what digestion is.

The questions in this quiz will highlight key words to students (the first of repeat exposures) and will expose common misconceptions, such as the digestive system not being an external system, urine being a product of digestion, and preconceptions around the definition of digestion.

The level of success of students in this quiz will also inform the pace of the lesson, and whether detailed review of prior understanding is needed.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
Explicit teaching of new learning ('I do') – digestive system role and structure		
How will you communicate the learning objectives to students? How will you break down your content into sequential steps to avoid overloading your students' working memory? How will you model the learning to support student understanding?	**Whole class:** 1. Read the learning objectives and success criteria to students, referencing back to them as they are encountered throughout the lesson. 2. Read lesson structure and keywords, so students can identify the next steps in learning and important concepts throughout the lesson.* 3. Explicit instruction of the difference between an organ and a system. This is done to review prior knowledge. a. Students complete a check for understanding.**	How will you help students retrieve information learned in previous lessons, units? How will you check for understanding and correct any errors or misconceptions before moving onto guided practice?

* 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 with 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.

** 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 an organ and a system. This is an important concept that will underpin all future learning in this lesson so it is important students can show their understanding here.

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
(continued) How will you communicate the learning objectives to students? How will you break down your content into sequential steps to avoid overloading your students' working memory? How will you model the learning to support student understanding?	4. Explain the role of the digestive system. Images are used here to aid the explanation and provide visual examples. a. Draw attention to the keyword diffusion.*** b. If learning is self-paced and occurring online, direct students to resources that they can use to explore concepts in further detail. 5. Digestion is a complex idea with many parts. Provide further explanation on how food is broken down for energy. a. Ask questions here: what are examples of food that contain carbohydrates? Fats?**** 6. Explicit instruction of parts of the digestive system. For each part, the function is explained, and the part is located on the diagram. a. Peristalsis is a term that may be unfamiliar but is also an important concept in digestion. Due to this, time is taken to explain it. A question is also included as a pause point for students to provide the opportunity for higher-order thinking and to recognise the significance of peristalsis. b. A check for understanding is completed before the remainder of the digestive organs are explained.*****	(continued) How will you help students retrieve information learned in previous lessons, units? How will you check for understanding and correct any errors or misconceptions before moving onto guided practice?

*** Highlighting the keywords in orange helps to draw attention to the critical concepts.
This is particularly useful when a slide contains several pieces of information, so students know which terms will be the focus going forward.

**** This helps to link learning to students' prior experiences with food and digestion. This increases engagement with the content learned by making information relevant to students' individual experiences.

***** Breaking new learning into smaller pieces reduces the load on students' working memory, and means they can process new information more effectively. This is done by discussing organs one at a time, and completing a check for understanding in between.
Once new information has been mastered, students can complete the independent practice which allows them to connect them into the larger context of the digestive system.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
Guided practice ('We do') – digestive system role and structure		
What worked examples will you provide students? What scaffolds and instructional supports will you introduce, and how will students use these? How will students work together to progress their skills and understanding?	**Whole class:** 1. Explain options for differentiation: students who are demonstrating a strong understanding can attempt on their own and use the modelled solutions to check their understanding. 2. Model the completion of the question.* a. Explaining decisions made and common incorrect answers.	How will you check for understanding and correct any errors or misconceptions before allowing students to independently practice?

* Modeling a correct answer provides an exemplar that shows students what an excellent response will look like for questions of this type. This helps students to understand what achievement of the success criteria will look like.

Explaining common incorrect answers also provides students with a non-example. This is equally as important, as it addresses common misconceptions and makes explicit to students what not to include in responses when they are practicing independently.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
Independent practice ('You do') – analysing and labelling diagrams showing diffusion		
How will students display that they have mastered the skills and content? How will you work with students to provide support and to gain insight into their learning?	**Whole class:** Explain the task to students and encourage them to complete the challenge task if they are confident in their understanding.* **Small groups:** For students who need more guided practice, gather them in a small group and model the steps needed to complete the task again. In this case, this would include reviewing the information presented in explicit instruction and guiding students' evaluation of options through targeted questioning. Gradual release of responsibility can be used here on a smaller scale, with each individual label. **Whole class:** Explain the answers to the independent tasks. Highlight common errors that may have been present, and explain choices made to achieve the correct answer.	What formative assessment will you gather to provide feedback to your students?

* Regular checks for understanding means students can evaluate their own progress in the learning objectives so far and will have the data needed to decide if their understanding is developed enough to complete the challenge 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
Explicit teaching of new learning ('I do') – digestive system adaptations		
	Whole class: 1. Explicit instruction of what an adaptation is, including examples, prior to explaining the villi as an adaptation.* 2. Explain the shape of the villi, paying particular attention to the term 'surface area'. Explain the significance of surface area using the orange 2D shapes. a. Complete a check for understanding here.** 3. Explain the role of the villi, linking to the function of the digestive system.***	

* Ideas have been introduced sequentially here. Students must understand the concept of adaptations before they can understand the significance of the villi.

** In a classroom, I would use an online quiz, fingers held up, or mini whiteboards to complete this formative assessment quickly.

Checks for understanding are important formative assessment tools. Regular checks for understanding will be used to ensure mastery of a concept is achieved before moving on. This ensures students can demonstrate a correct understanding of a concept before connecting a new concept to this previous learning. It makes sure that misconceptions are not being embedded into students' understanding of a topic and that they are ready for the next steps in their learning.

If a high success rate is not achieved in this check, I will spend time explaining the incorrect answers, reiterating my instruction of the content with a focus on the commonly misunderstood aspects, and then a different check for understanding can be provided to test for understanding. Once a high success rate has been achieved, students are ready to progress to the next step in the lesson.

*** By breaking content into smaller chunks, I can ensure students have learned one concept before moving on to the next. Without an understanding of surface area, students will not have a meaningful understanding of how the villi allow the digestive system to perform its role.

Ensuring this understanding is formed means students will not only be able to repeat the concept but will be able to apply it to unfamiliar concepts- a more complex skill that reflects deeper learning.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
Guided practice ('We do') – applying key terms to do with adaptations of the digestive system		
	Whole class task 1. Read the question out and break it down into its components. Explain the requirements of the question using the components highlighted. a. Explain options for differentiation: students who are demonstrating a strong understanding can attempt on their own and use the modelled solutions to check their understanding. 2. Model the completion of the question. a. Explain there can be more than one correct answer. To extend students, ask for other alternatives to the sentence modelled. 3. An alternative to this can be providing a non-example or asking students to contribute non-examples.*	

* This provides students with an opportunity to extend their understanding of the concepts learned.

Formative assessment, as well as answers to the previous question asked, will provide me with the information I need to decide if this is an appropriate next step in student learning.

To scaffold this task, students can complete it as a think-pair-share. This allows students to act as supports for their pair, or as a more knowledgeable other who can provide guidance and explanations if necessary.

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
Independent practice ('You do') – applying key terms to do with adaptations of the digestive system		
	Whole class task: Explain the task to students and encourage students who are confident in demonstrating their understanding to complete the challenge task. **Small groups task:** For students who need more guided practice, gather them in a small group and model the steps needed to complete the task again. In this case, this would include choosing 3 key words and working together with students to construct a sentence. **Whole class task:** Explain the answers to the independent tasks. Highlight common errors that may have been present, and explain choices made to achieve the correct answer.	
Guided practice ('We do') – consequence of adaptations in the digestive system		
	Whole class task: 1. Read the question out and break it down into its components. Explain the requirements of the question using the components highlighted. a. Explain options for differentiation: students who are demonstrating a strong understanding can attempt on their own and use the modelled solutions to check their understanding. 2. Model the completion of the question.	

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
Independent practice ('You do') – processing data: constructing a table of results		
	Whole class task: Explain the task to students and encourage students who are confident in demonstrating their understanding to complete the challenge task. **Small groups task:** For students who need more guided practice, gather them in a small group and model the steps needed to complete the task again. This may include asking questions to break the task down into smaller, more manageable chunks which students can complete one at a time to structure an extended response. **Whole class :** Explain the answers to the independent tasks. Highlight common errors that may have been present, and explain choices made to achieve the correct answer.	

Lesson stage	Tasks What are the specific classroom or instructional activities that you and your students will use in each stage?	Monitoring student learning
Lesson summary		
How will you show students how far they have come in the lesson? How will you review their learning? How will you help students reflect on, or summarise the most important parts of their learning?	1. Review the success criteria from the lesson, pointing to specific skills demonstrated the students will have demonstrated.* 2. Use the exit quiz to get a sense of what students know and are able to do as a result of the lesson.**	What evidence will you gather from your students to understand what you may need to review next lesson?

* 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?

Students being able to identify whether they have achieved a certain skill or piece of knowledge is a critical step in mastery learning.

** 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. I will use this to inform retrieval practice and revision throughout the unit, and what the next steps in learning will be in the subsequent lessons.