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# OXFORD *is* SCIENCE FOR EVERY CLASSROOM

- 3 series
- 3 approaches
- 3 ways to achieve



# OXFORD *is* SCIENCE

- 3 series
- 3 approaches
- 3 ways to achieve

YEAR 7

YEAR 8

YEAR 9

YEAR 10

COMPONENTS AT EACH YEAR LEVEL

## OXFORD SCIENCE

- a concept-development approach
- every two-page unit forms a complete lesson with homework
- clear, simple language



- Student Book - 232 pages
- obook assess - ebook, interactives, videos, quizzes
- Teacher obook assess - teacher notes, answers, worksheets, EAL support, assessments and tests

## AMAZING SCIENCE

- a high-engagement approach
- embedded literacy support
- magazine format



- Student Book - 176 pages
- obook assess - ebook, interactives, videos, quizzes
- Teacher obook assess - teacher notes, answers, worksheets, EAL support, additional experiments, assessments and tests

## oxford big ideas science

- an inquiry-based approach
- deep, transferrable understandings and skills
- opportunities for extension



- Student Book - 288 pages
- obook assess - ebook, interactives, videos, quizzes
- Workbook - scaffolded homework activities
- Teacher Kit + obook assess - print and digital teacher notes, answers, worksheets, assessments and tests

# OXFORD SCIENCE

Save time and achieve more – one concept, one spread, one lesson

*Oxford Science* is a complete science package with a focus on clear and precise concept development – helping you save time and supporting your students to achieve more. Every two-page unit is a neatly packaged lesson containing carefully crafted explanations, stunning visuals, differentiated questions and links to a valuable bank of experiments at the end of the book. See your whole year of teaching in front of you spread by spread, concept by concept. *Oxford Science* brings a new level of instructional elegance to secondary science and is further enhanced by obook and assess resources, including worksheets, tests, answers, interactives, videos and teaching plans.

Units are uniquely engineered into double-page spreads: one concept, one spread, one lesson. Learning starts right from the unit heading!

Each unit begins with a carefully crafted summary of the concept.

Spreads are linked to one or more experiments, challenges or skills tasks.

Students explore concepts progressively encouraging incremental learning and, by the end of the chapter, complete understanding.

Chapter-opening concept maps plot the learning pathway for students, unit by unit, concept by concept. Save time by using the unit headings to structure your teaching plan.

Accessible language and appropriately levelled content for differentiated learning provide access points for struggling students and enough depth to keep advanced students going.

**Check your learning** questions allow students to consolidate their understanding. Bloom's taxonomy is used to differentiate questions and homework tasks are available on every spread.

Every chapter begins with a 'What if?' feature that encourages student-directed questioning and inquiry. As the series progresses, students discover that their own 'What if...?' questions are actually testable hypotheses.

Science skills are always taught as a practical task, not theory.

**//SCIENCE AS A HUMAN ENDEAVOUR//** spreads make strong links to real-world applications.



**Extend your learning** questions can be used as homework tasks or as an extended project.

Experiments, challenges and skills tasks are organised at the end of the book rather than being confined to a double-page spread, allowing for increased instructional elegance.





# Amazing Science

## Inspire curiosity, wonder and questioning – because science is amazing!

Amazing Science has been created for today's science classroom. It delivers a simple, highly visual learning experience designed to fuel student engagement. Short, magazine-style units of work ignite a sense of awe and wonder, prompting students to ask questions and look further. Clear, simple language and literacy support on every page engage even the most reluctant learners. At each level, Student Books are supported by obook and assess resources, including worksheets, tests, answers, interactives, videos and teaching plans. Open students' minds to the amazing world of science!

Self-contained units with clear headings and activities help students easily navigate content.

Key learning points are identified in an introduction at the start of each unit.

Visual learners are drawn to high-impact images and diagrams, then encouraged to read captions in order to consolidate understanding.

**AT HOME IN THE DESERT**

Life in a desert biome is difficult. Desert plants and animals experience hot days and cold nights, and shortages of water and food. Over time, native plants and animals have adapted to live in the harsh desert environment.

Desert plants have many adaptations. Some have thick, waxy leaves to prevent water loss. Some have deep roots to reach water underground. Some have small, spiny leaves to reduce water loss.

Desert animals have many adaptations. Some are nocturnal to avoid the heat of the day. Some have thick fur to insulate them from the cold at night. Some have long, thin legs to help them run quickly across the sand.

**CHECK IT OUT**

1. What conditions do desert animals face?
2. Give three examples of animals that live in the desert.
3. Give three plant adaptations to desert life.
4. Design your own desert animal and label its adaptations to live in the desert.

### CHECK IT OUT

activities on each spread test student understanding and comprehension.

### LOOK IT UP

features define key scientific terms that are bolded on each spread.

**THE AMAZING STOMACH OF A COW**

Unlike humans, cows have a four-compartment (part) stomach to help them digest and process food. Each of the four compartments plays an important role.

**1. Oesophagus** - Swallowing food into the stomach.

**2. Rumen** - The food enters the first compartment of the stomach called the rumen. Here, the grass is softened by fluids before it moves to the second part of the stomach.

**3. Reticulum** - The reticulum is the second compartment of the stomach. It is where the grass is again softened and clumps together to make small lumps called cud.

**4. Cud** - Each cud is then regurgitated (vomited) back to the mouth where the cow can chew it quickly and easily. This is why cows always appear to be chewing.

**5. Omasum** - The chewed cud travels into the omasum, the third stomach compartment. The omasum has many folds of tissue that look like a fan. It is here that the cow absorbs water and nutrients.

**6. Abomasum** - The food then travels to the abomasum, the fourth stomach compartment. This is often called the true stomach because it has glands like a human stomach. The abomasum breaks the food down into **proteins**, **vitamins**, simple **carbohydrates**, **fats** and **amino acids**.

**7. Small intestine** - The small intestine is the main site for absorption of important chemicals.

**8. Large intestine** - The large intestine absorbs water and electrolytes.

**9. Udder** - The udder contains the milk in cows that have given birth to a calf. It takes up to 20 litres for a cow to turn grass into milk. For every litre of milk a cow makes, more than 400 litres of blood must travel around her udder to deliver the materials from the grass. Australian dairy cows produce about 15 litres of milk a day.

**LOOK IT UP**

**amino acid** - a small compound that makes up proteins

**carbohydrate** - class of compound containing carbon, hydrogen and oxygen atoms

**protein** - large, complex molecule, plays many critical roles in the body, made of amino acids

**nutrients** - material that cows eat (ingest) and absorb (digest) from their four-compartment stomach to further break down the cellulose, which is difficult to digest

**CHECK IT OUT**

1. How is the stomach of a cow different to yours?
2. Which other animals have a similar digestive system to a cow? Which is the group of animals called?
3. Describe the purpose of a cow's incisor and molar teeth.
4. Why does a cow always appear to be chewing, even when it isn't eating grass?
5. Which of the four compartments is a cow's stomach known as the true stomach? What job does it do?

Simple, clear diagrams help students understand important scientific concepts.

**EXPERIMENT #1**

**EXAMINING SKELETONS**

**AIM:** TO EXAMINE THE SKELETAL STRUCTURES OF THREE MARINE ORGANISMS

**METHOD**

1. Observe the external features of the fish.
2. Carefully cut the fish in half lengthways so you can see the internal skeleton.
3. Observe the skeleton of the fish.

**RESULTS**

Draw labelled diagrams of each organism's skeleton.

**DISCUSSION**

1. Consider the fish.
  - a. Where is the skeleton of the fish located?
  - b. What is this type of skeleton called?
2. Consider the squid.
  - a. Where is the skeleton of the squid located?
  - b. What is this type of skeleton called?
3. Does the squid have a skeleton? Suggest how it might hold its shape.
4. In which group of animals (vertebrate or invertebrate) would you place each of the organisms you observe? Why?
  - a. What are you - a vertebrate or an invertebrate?

**CONCLUSION**

What types of skeletons are provided?

**DISSECTION EQUIPMENT**

A dissection kit has all the tools you will need for dissecting organisms in the school laboratory. Some of the key tools you will use are:

- probe** - to hold back sections to allow you to examine features
- scalpel** - very sharp tool for cutting open the specimen
- dissecting scissors** - very sharp, thin scissors for accurate cutting
- forceps** - for cleaning objects and holding them back to allow observation
- needle** - for piercing objects
- ruler** - for measuring features of the specimen

Step-by-step instructional photographs scaffold learning and aid visual literacy.

Each Student Book contains a careful selection of core experiments proven to work in the classroom. Many more experiment worksheets are provided on obook assess.

Questions and tasks are organised according to each unit of work in the chapter and provide complete coverage during assessment.

### REVIEW

tasks at the end of every chapter consolidate and extend learning.

**REVIEW**

**CLASSIFYING LIFE**

**CLASSIFYING LIFE ON EARTH (PAGES 22-23)**

1. Arrange these terms in order from the level that contains the most number of organisms to the level that contains the least number of organisms: family, kingdom, species, class, phylum, genus, order.
2. Explain what a dichotomous key is.
3. Use the dichotomous key and the diagrams of four imaginary beetles below to:
  - a. identify and name the beetles numbered 1 to 4.

**WHAT'S IN A NAME? (PAGES 24-25)**

1. Apply the information in the table to match the scientific names of three live Australian animals with their common names: wallaby, red-necked kangaroo, platypus.

Scientific name	Common name
Macropus fulvus	Wallaby
Perameles nasuta	Platypus
Phascogalea crinitus	Red-necked kangaroo
Diprotodon optatum	Quagga
Chlamydomachus kingii	Quagga

**TOP 5 AMAZING PLANTS (PAGES 36-37)**

18. What do all plants have in common?
19. How does photosynthesis occur and why is it important? Explain your answer.
20. Identify the plant shown below.
21. How do you think this plant reproduces? Explain your answer.

**Oxford Big Ideas Science** delivers deep understanding through inquiry-based learning. Students discover the 'big ideas' of science by working through activities designed to deeply embed concepts. Each Student Book uses the six overarching ideas from the Australian Curriculum: Science to connect content across the different disciplines of science. The series seamlessly covers the general capabilities and cross-curriculum priorities.

Each chapter is designed to visually and creatively engage students with beautiful artwork, case studies and source material.

**FORCES AND MOTION**

## Forces in balance

Forces are essential to our understanding of the world. Without forces, nothing would change—stationary things would stay still and moving things would keep moving, never slowing down and never stopping. Without forces, the Earth would not revolve around the Sun—it would break apart and head out into space. No work would get done, no new inventions could be created, no plants would grow and no animals, including us, would exist.

**7.1 How do we recognise a force?**

Force is an idea that can explain how or why things happen. We can't see forces, but we can see their effects and manipulate them to suit our needs. Scientists have been investigating the effects of forces for thousands of years. Many jobs and activities have been made significantly easier by the harnessing of forces. In particular, transport has become much easier with the harnessing of forces. Transport is much faster than it used to be, and many cars are now designed specifically for speed and agility rather than just to move people from A to B. When a car is filled with fuel, the amount of energy stored in the fuel will determine how far it can travel. But to understand what causes the car to move, we have to think about what forces push or pull on the car.

**7.2 What are simple machines?**

Early humans invented the first machines to help them in their quest for survival—to hunt, to cultivate crops, to build shelter and to protect themselves. These basic needs gave rise to the first simple machines. They discovered how to use levers—moving large rocks with sticks and killing animals with clubs. Excavations reveal that the sharp edges of jagged rocks were used to slice through a carcass—early humans had discovered the wedge. These sharp stones were later placed on the end of a long stick to fashion the first spear. The spear was an effective killing tool that gave the hunter the advantage of attacking from a distance.

**7.3 How do we use simple machines?**

Early humans did not invent the lever. Their levers were part of a sophisticated set of levers within each person—the skeleton. These living levers made work easier and enabled early humans to successfully hunt other animals using weapons such as sticks and stones. We use simple machines every day, although we may not know it. Paddling a kayak involves using the levers in our bodies and the paddle as another lever. When we ride a bike we use wheels and axles in gears, and hydraulic pressure lifts up cars for repairs.

**7.4 How do we recognise a force?**

1 What forces can you 'see' at work in Figure 7.1?  
2 Can you think of anything else in your everyday life that you can't see but you know it there?  
3 Are any forces acting on you right now?

**7.5 How do we use simple machines?**

1 Which skeletal levers did Justin Jones and James Gestrinsson use to paddle the kayak?  
2 How do the levers in your body work as levers?

CHAPTER 7 • FORCES IN BALANCE 225

Chapter openers introduce key inquiry questions and are designed to spark interest and elicit prior knowledge.

**DISCOVERING IDEAS**

## How do we recognise a force?

The word 'force' has many meanings in everyday conversation. In science, a force is a physical action. It is a push or pull acting upon an object as a result of its interaction with another object. Sometimes forces are easy to see, like the force of Harry Kewell's foot kicking a soccer ball. Other forces are invisible and harder to recognise, like the force that causes dust particles to stick to a television screen.

### Forces at work

How many examples of movement can you think of? Brainstorm ideas with a partner. Does movement always involve an object travelling a distance? Is there a minimum distance? What about travelling at a constant speed?—are forces acting to change the speed of the object? Would the same apply to chocolate left in the sun? List as many types of movement as you can in 15 minutes. Then share your observations and thoughts with the rest of the class. All your examples are situations in which forces are at work.

**Identifying forces**

One way to look for a force is to look for movement and change. Nothing changes motion unless it is pushed or pulled. We have a lot of different ways of saying 'push'—for example 'above', 'press' and 'nudge'—and 'pull'—for example 'tug', 'heave' and 'drag'. They all refer to the same action of pushing or pulling. These pushes and pulls are forces. Forces act on everything around us all the time. Usually, more than one force is acting on any object at one time, but often we are unaware of them. Many forces are acting on your body right now that you probably aren't aware of. For example, the chair you are sitting on is pushing up on you, and the Earth's gravity is pulling you downwards. Because these forces that are acting in opposite directions are in balance (equally strong), they 'cancel out' each other's effect and so you remain still.

You exert forces on other objects too. Right now you are pushing down on the chair you are sitting on. You may be pushing a pen or pencil or eraser across your table or desk. When you press on a piece of plasticine, you are exerting a force on it. This force causes the plasticine to change shape. When you kick or throw a ball, you are pushing on it. This force causes the ball to move. When you catch a ball, you are still giving it a push. This time, the push force causes the ball to stop moving.

Discovering Ideas tasks allow students to discover science themselves, before they have all the answers.

Content is designed for depth of learning. Concepts are revisited with increasing levels of complexity so that students gain a rich understanding of key concepts.



Spectacular and current photographs bring science to life.

## Examining skeletons

**Aim**  
To examine the skeletal structures of three marine organisms.

**Materials**  
1 fish (whole)  
1 prawn  
1 squid  
Newspaper  
Dissecting board  
Dissecting kit  
Pair of vinyl or latex gloves

**Method**

- 1 Observe the external features of the fish.
- 2 Carefully cut the fish in half lengthways so you can see the internal skeleton.
- 3 Observe the skeleton of the fish.
- 4 Feel the outside of the prawn and then peel it.
- 5 Cut the prawn in half and observe the inside of the prawn.
- 6 Feel the outside of the squid and then cut it in half.
- 7 Observe the inside of the squid.

**Results**  
Draw labelled diagrams of each specimen's skeleton.

**Discussion**

- 1 Consider the fish.
  - a Where is the skeleton of the fish located?
  - b What is this type of skeleton called?
- 2 Consider the prawn.
  - a Where is the skeleton of the prawn located?
  - b What is this type of skeleton called?
- 3 Does the squid have a skeleton?
- 4 In which group of animals (vertebrate or invertebrate) would you place each of the organisms observed? Why?
- 5 What are you, a vertebrate or an invertebrate?

**Conclusion**  
What types of skeleton are possible?

Step-by-step instructional photography models correct skills and techniques.

Overarching Ideas tasks appear in every chapter and use the big ideas from the Australian Curriculum: Science to integrate and connect the disciplines of science.

## OVERARCHING IDEAS

### Uranium mining in Kakadu

**Matter and energy**  
Kakadu National Park in the Northern Territory is on the World Heritage List for its natural and cultural values. It supports four river systems and a large number of species found nowhere else on Earth. Indigenous Australians have lived in and around Kakadu for thousands of years. Large deposits of uranium are located within the park. Uranium is used as a fuel for power stations. This resource is mined and exported, bringing in large amounts of money for the Australian Government. The mining has been controversial over the years because of the impact on the landscape, objections from Indigenous groups about the native title of the land, and the dangers of nuclear power, nuclear weapons and uranium mining itself.

- 1 What uranium mines are located within Kakadu?
- 2 What issues have those mines had?
- 3 What are the potential dangers of uranium mining and nuclear power?
- 4 How is energy released from the uranium in a nuclear power station?
- 5 Carry out research to find out approximately how much energy can be released from one tonne of uranium. Compare this to coal and comment on your findings.

**Resource issues**  
Use the Internet to investigate an environmental issue you feel passionate about that has had an effect on the Earth's resources, such as pollution of waterways or the effects of mining.

• What are the different sides to the topic?  
• Why is your topic an issue?  
• What is your opinion on the issue?  
• How would you gather support for 'your side'?  
• Would you protest? If so, how?  
• What are the dangers of protesting?  
• What would you see as an acceptable outcome?

### What do you know about uranium?

- 1 If you watch The Simpsons, write a story about something that went wrong at the Springfield nuclear power plant.
- 2 Where in Australia are our uranium resources found (see Fig. 6.5 on page 189)?
- 3 Why do you think Australia has not turned to nuclear power yet?
- 4 What does radioactive mean?
- 5 How can radiation be harmful?
- 6 How is a nuclear power station different from a coal-fired power station? How are they similar?
- 7 What happens in nuclear fission?

## CONNECTING IDEAS

### How is life on Earth organised?

Have you ever visited Uluru or Kata Tjuta (the Olgas)? This area is part of Australia's arid zone, a region that receives less than 250 millimetres of rainfall per year. Australia is the second driest continent in the world. Despite the harsh climate, this area is home to hundreds of different organisms.

When early European explorers first visited this region in the 1870s they were confronted with a harsh landscape. Their initial aim was to find a route for the overland telegraph line from Adelaide to the Top End and to set up pastures for sheep and cattle grazing. They were amazed that the region was so beautiful.

However, the traditional owners of the land, a group of Aboriginal people, had lived on this land for thousands of years and understood it well. They lived a nomadic life, travelling in small family groups and surviving by hunting wildlife and gathering food from the land.

The Anangu knew where to find food to survive and, more importantly, which areas were the best for hunting and gathering. The Anangu classified their environment to help them locate the previous food. They used their names:

**Pitj**—rocky areas, gorges, steep slopes. Animals come to this area to find shelter and water.  
**Puti**—open woodlands. After the rains this area has an abundance of grass, which the kangaroos eat. Honey ants build their nests in this area.  
**Pitj-pitj**—open plains, low areas between dunes. This is the best place to gather seeds to eat.  
Reptiles are particularly suited to this environment. The thorny devil, like all reptiles, uses the environment to regulate its temperature. When it wants to become active it lays in the sun, but when it is too hot it hides in a burrow until the heat has passed.

One fascinating thing that the thorny devil can do is drink water with its feet! It places its feet in a puddle and water moves up by capillary action along grooves in its skin to the corner of its mouth.

Mammals are rarely seen during the day and are nocturnal and come out in the evening, avoiding the heat of the daytime desert. The most abundant groups of mammals are the placental (see Fig. 2.42 on page 70) and the marsupial.

Marsupials, such as the bilby, give birth to underdeveloped young but protect them by having a pouch where further development can occur. The pouch is similar to that of a kangaroo, however, it is a backward-opening pouch. When the young are fully developed they can leave the pouch and survive the harsh climate.

Follow the link on the eBook to find out about the kind of environment the Anangu live in and the five plants that they ate.

In a group of four, use a large sheet of paper to create two collages on the one sheet, one showing living things and one showing non-living things you would expect to find in Uluru-Kata Tjuta National Park. One pair creates the 'living' collage and the other pair creates the 'non-living' collage. Discuss your collages and the system of classification for the natural habitat around them?

Follow the link on the eBook to investigate the mammals, reptiles, birds and invertebrates found in the Uluru-Kata Tjuta National Park. Make a list of five for each category. Classify each one into its correct group.

One of the classes of vertebrate is Anura. What characteristics of amphibians would make it difficult for them to live in arid environments? What other animals could struggle to survive in arid environments?  
Why do you think the bilby's pouch is rear-facing?  
Discuss why marsupials would find it difficult to breed in arid environments.

Follow the link on the eBook to investigate which mammals can be found in Australia's arid environments. Classify each of these mammals as placental, marsupial or monotreme. List any specific Latin double names given for each animal (genus and species).

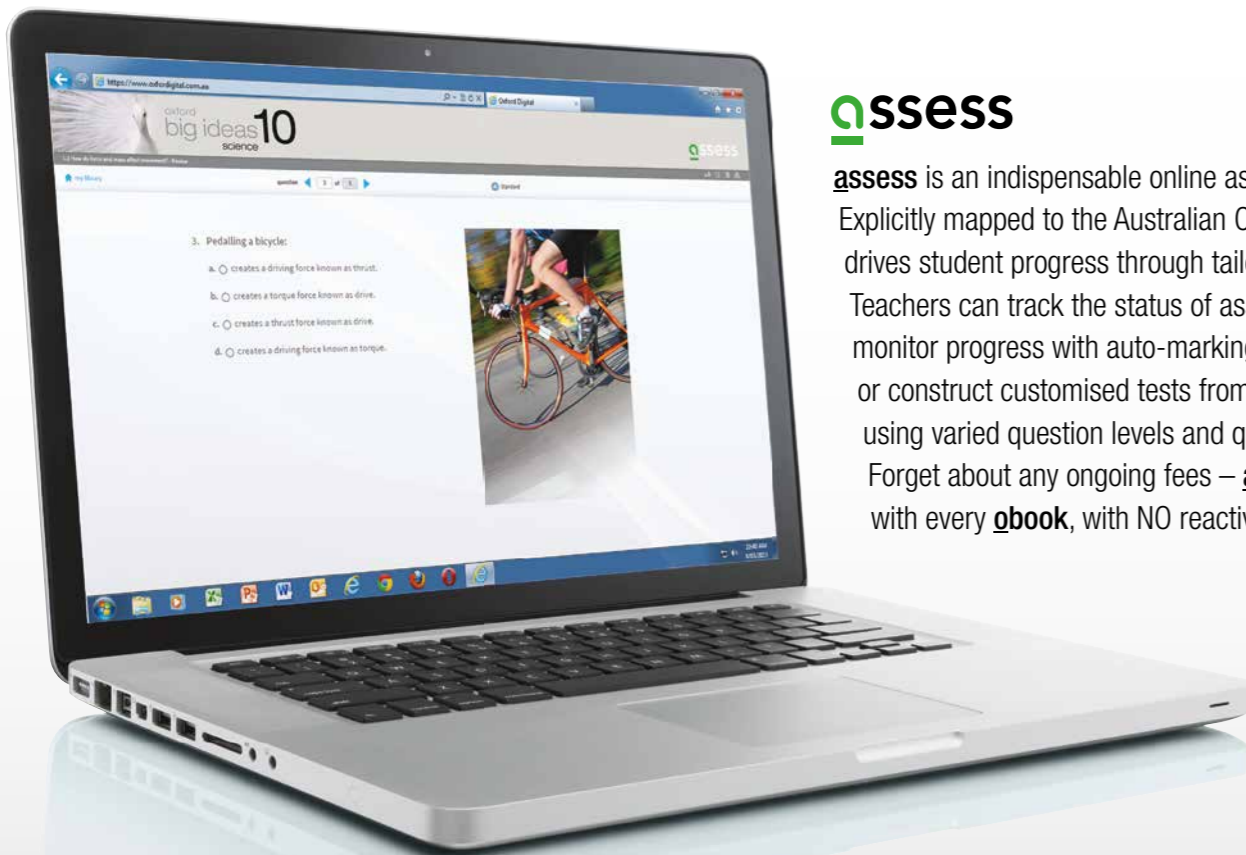
Connecting Ideas activities encourage students to transfer and connect what they have learned in each chapter to areas of interest or personal experience, making learning fun and meaningful.



Oxford's premium digital resources for secondary school students and teachers are designed to help tailor learning pathways and deliver results. For information about products and purchasing visit [oup.com.au](http://oup.com.au)

## obook

**obook** provides an interactive electronic version of the student book in an easy-to-read format. It features multimedia links, interactive learning objects, videos, note-taking, highlighting and bookmarking tools, and live question blocks. **obook** is compatible with laptops, iPads, tablets and IWBs, and also offers page view (in flipbook format) that can be used offline.



## assess

**assess** is an indispensable online assessment tool. Explicitly mapped to the Australian Curriculum, it drives student progress through tailored instruction. Teachers can track the status of assignments, monitor progress with auto-marking **assessments**, or construct customised tests from the **testbank** using varied question levels and question types. Forget about any ongoing fees – **assess** is FREE with every **obook**, with NO reactivation fees!



## Teacher obook assess

Practical and targeted teacher support is provided in digital format via **Teacher obook assess**. **obook** provides teachers with **access** to the Student Book together with added extras like teaching programs, lesson ideas, worksheets, class tests and answers to all activities in the Student Book. **assess** offers the ability to assign interactive quizzes and tests, gather results and monitor student performance.

**Teacher obook assess** now also offers Dashboard view – an online lesson control centre, allowing teachers to instantly preview, access and assign resources like videos, interactives, worksheets and tests to students.

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