Suggested teaching program

**Chapter 5: Classification**

Time allocation: 3 weeks

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| **Context and overview** |
| In year 7, students explore the diversity of life on Earth and continue to develop their understanding of the role of classification in ordering and organising information. |
| **Syllabus outcomes addressed** |
| • Classification helps organise the diverse group of organisms ACSSU111  • Scientific knowledge has changed peoples’ understanding of the world and is refined as new evidence becomes available ACSHE119  • Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate ACSIS129 |
| **Achievement standards** |
| Students classify and organise diverse organisms based on observable differences. They describe situations where scientific knowledge from different science disciplines has been used to solve a real-world problem. Students explain how the solution was viewed by, and impacted on, different groups in society. Students communicate their ideas, methods and findings using scientific language and appropriate representations. |

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| **Student book section** | **WA Syllabus links** | **Suggested indicators of learning and understanding** | **Suggested teaching and learning activities** | **Resources** |
| **5.1 Classification organises our world**  **(pages 80–81)** | *Science Understanding*  ACSSU111  *Science as a Human Endeavour*  ACSHE119  ACSHE223  *Science Inquiry Skills*  ACSIS124  ACSIS133 | By the end of this unit, students should be able to:   * explain that classification systems were developed to help scientists communicate information about organisms despite their different locations and languages * describe some of the changes in classification systems that have been used since Aristotle in 322BC * identify the current classification system as that devised by Linnaeus in the 1700s. | **The purpose of classification**  Introduce the concept of classification by brainstorming the different types of living things on the board.  Students could play ‘celebrity head’, allocating a living thing to a student who then needs to ask yes/no questions to identify their organism. Use the questions to identify groupings such as ‘is it a plant?’ and features that are useful for identification such as ‘does it have feathers?’  **Aristotle’s Great Chain of Being**  Identify the timeline at the bottom of page 80 that describes the contribution of Aristotle to early ideas of classification. Aristotle is known for his ‘Great Chain of Being’, which ranked life from rocks to God in order of importance.  Ask students to consider, evaluate and discuss this method of classification. Was it accurate? Would it have satisfied the understanding of the world held by people in BC times? Would it have satisfied people today? | **Oxford Science 7 WA resources**  - Check your learning page 81  - Challenge 5.1 page 192 |
| **Additional resources**  The Linnaean Society of London’s educational resources.  https://www.linnean.org/education-resources  Iconic illustration of Aristotle’s Great Chain of Being.  <http://web.stanford.edu/class/engl174b/chain> |

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| **5.2 Living organisms have characteristics in common**  **(pages 82–83)** | *Science Understanding* ACSSU111  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:   * describe the eight characteristics shared by all living things using the acronym MR N GREWW. | **Putting it together**  Have students write the letters MR N GREWW vertically down a page. In a different colour, they should complete the word for each letter. For example, M becomes Move.  This simplified list will be beneficial when it comes time to revise.  Challenge the students to provide additional examples of each characteristic, providing a range of obvious and obscure examples. | **Oxford Science 7 WA resources**  - Check your learning page 83 |
| **Additional resources**  Living or non-living interactive and animal or not an animal interactive.  <http://sciencelearn.org.nz/Science-Stories/Earthworms/Living-or-non-living> |
| **5.3 Classification keys are visual tools**  **(pages 84-85)** | *Science Understanding*  ACSSU111  ACSHE119  *Science Inquiry Skills*  ACSIS124  ACSIS129  ACSIS130  ACSIS133 | By the end of this unit, students should be able to:   * explain that different keys are used to sort organisms into groups. The dichotomous key sorts organisms by making simple ‘yes’ or ‘no’ decisions. * construct and read keys in tabular and diagram form. | **Classifying the class**  Work as a class to construct a dichotomous key on the board that classifies the students in the class. Ensure characteristics used to group students are sympathetic to the group. For example, eye colour is appropriate, while weight or ability is not. Discuss the complications that would arise if a characteristic such as hair length or colour were used. Would the key be useful in the future if a student chose to cut or colour their hair? | **Oxford Science 7 WA resources**  - Check your learning page 85  - Challenge 5.3 page 193 |
| **Additional resources**  A dichotomous word key to identify a series of pictures of aliens  <http://www.biologycorner.com/worksheets/pamishan.html> |

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| **5.4 The classification system continues to change**  **(pages 86-87)** | *Science Understanding*  ACSSU111  ACSHE119  ACSHE121  *Science Inquiry Skills*  ACSIS125  ACSIS126 ACSIS132  ACSIS133 | By the end of this unit, students should be able to:   * describe the two-part naming system devised by Carl Linnaeus * identify the genus and species of an organism from its two-part name. | **Familiar names**  Ask students to suggest the common names for a range of organisms for which you provide the scientific names. Students could then suggest how the scientific names are decided. Examples could include *Rattus rattus* for the common black rat, *Bufo marinus* for the cane toad or *Macropus rufus* for the red kangaroo.  Students could also research a range of organisms to find out their scientific names.  **Root words**  Use table 10.1 page 194 to create names for more imaginary animals. Students could be challenged to draw their animals, labelling the features that relate to its name.  As an extension, students could be challenged to add to the table. | **Oxford Science 7 WA resources**  - Check your learning page 87  - Challenge 5.4 page 194 |
| **Additional resources**  A digital database of Victoria fauna.  <http://museumvictoria.com.au/bioinformatics/> |
| **5.5 All organisms can be divided into five kingdoms**  **(pages 88-89)** | *Science Understanding*  ACSSU111  ACSHE119  ACSHE121  *Science Inquiry Skills*  ACSIS125  ACSIS129 ACSIS130  ACSIS133 | By the end of this unit, students should be able to:   * explain that Life on Earth is classified by scientists into 5 kingdoms: Animalia (animals), Plantae (plants), Fungi, Protista (algae) and Monera (bacteria) * understand that classification is based on cell structure, what the organisms look like and how they absorb nutrients. | **Kingdoms at the table**  Challenge students to present the information about the five kingdoms in a more succinct format such as a table or pictogram.  **Only five?**  Two, five or six? Or is it 3 Domains?  As an extension, students could research the changes in thinking that have led to the current structure and classification of life on Earth. | **Oxford Science 7 WA resources**  - Check your learning page 89  - Challenge 5.5 page 195 |
| **Additional resources**  Australian Museum information about classification and Australian animals.  <http://australianmuseum.net.au/what-is-classification>  <http://australianmuseum.net.au/animals> |

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| **5.6 Animals that have no skeleton are called invertebrates**  **(pages 90-91)** | *Science Understanding*  ACSSU111  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:   * explain that invertebrates have either an exoskeleton or no skeleton * explain that invertebrates make up 96% of all animals * • identify the six main phyla of invertebrates: arthropods, poriferans, molluscs, cnidarians, nematodes/platyhelminths/annelids and echinoderms. | **Examining invertebrates**  Provide students with a selection of invertebrate specimens. These could be preserved or live specimens. Students could investigate the external features of the organisms using a hand lens, and then suggest the phylum to which each belongs. A class discussion would be useful where discrepancies exist. | **Oxford Science 7 WA resources**  - Check your learning page 91  - Experiment 5.6 page 196  - Challenge 5.6 page 197 |
| **Additional resources**  Key to the invertebrates by CSIRO  <http://www.ento.csiro.au/education/key/couplet_01.html>  Companion website to the Bugs exhibition at Melbourne Museum. The website includes information and games as well as links to further resources.  <http://museumvictoria.com.au/bugs/index.aspx> |

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| **5.7 Vertebrates can be organised into five Classes**  **(pages 92-93)** | *Science Understanding*  ACSSU111  *Science Inquiry Skills*  ACSIS125  ACSIS126  ACSIS129  ACSIS133 | By the end of this unit, students should be able to:   * explain the difference between a vertebrate and an invertebrate * explain that vertebrates are sorted into five Classes – mammals, fish, birds, reptiles and amphibians * use the terms endotherm and ectotherm to group the vertebrates. | **Going wild!**  Visit the *Wild* exhibition at the Melbourne Museum. This could be done in person or via the virtual exhibition online. The website dedicated to the exhibition provides a lot of information and interactive experiences to reinforce the grouping if vertebrates into five Classes.  <http://museumvictoria.com.au/melbournemuseum/discoverycentre/wild/amazing-animals/>  Alternately, a visit to a zoo or wildlife sanctuary would be a great way to engage the students in the topic. | **Oxford Science 7 WA resources**  - Check your learning page 93  - Challenge 5.7 page 197 |
| **Additional resources**  Howstuffworks videos about mammals.  <http://animals.howstuffworks.com/mammals>  American Museum of Natural History past exhibition on extreme mammals. Includes videos and articles.  <http://www.amnh.org/exhibitions/past-exhibitions/extreme-mammals>  BBC webpage dedicated to animals, featuring information and links to videos and activities.  <http://www.bbc.co.uk/nature/animals>  Zoos Victoria’s information about a range of vertebrates.  <http://www.zoo.org.au/animals> |
| **5.8 Plants can be classified according to their characteristics**  **(pages 94-95)** | *Science Understanding*  ACSSU111  *Science Inquiry Skills*  ACSIS125  ACSIS126  ACSIS129  ACSIS133 | By the end of this unit, students should be able to:   * explain that plants are generally classified according to how they transport nutrients, or how they reproduce * explain the importance of flowers and the difference between monocotyledons and dicotyledons. | **Using field guides**  Source field guides for local flora and challenge students to identify plants in the school grounds or a local bush or parkland area.  **Find out more**  Students could visit the Bush Blitz website to find out more about the identification and classification of Australia’s biodiversity. | **Oxford Science 7 WA resources**  - Check your learning page 95  - Challenge 5.8 page 198 |
| **Additional resources**  Bush blitz is an Australian program that aims to discover and describe Australian species.  <http://www.bushblitz.org.au> |

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| **5.9 The first Australian scientists classified their environment**  **(pages 96-97)** | *Science Understanding*  ACSSU111  *Science as a Human Endeavour*  ACSHE120  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:   * describe some of the ways in which some indigenous Australians classified and communicated their understanding of local flora and fauna. | **Working together**  This topic can lead to some really interesting class discussions. Many students will have stories to share about their experiences in outback Australia. Others will be able to offer insights into the Indigenous history of local areas.  Read this information together and discuss interesting points. Further information could be sort from local Indigenous groups or Landcare groups. | **Oxford Science 7 WA resources**  - Extend your understanding page 97 |
| **Additional resources**  Royal Botanic Gardens Melbourne activities focussing on indigenous understandings of plants, animals and the environment.  <http://www.rbg.vic.gov.au/documents/Connecting_to_Country_Kit_2013.pdf>  The Tree of Life web project is a biodiversity database that also includes evolutionary history. It also includes extinct species such as *Tyrannosaurus rex*.  <http://tolweb.org/tree/phylogeny.html> |
| **Review**  **(pages 98-100)** | *Science Understanding*  ACSSU111  *Science as a Human Endeavour*  ACSHE120  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:   * identify sections of this chapter that may require further revision. | **Teach your peers**  Consider having the students work in groups to reteach the content of the unit to the class for the purpose of revision. Each group could be allocated a double-page to cover. | **Oxford Science 7 WA resources**  - Review questions 1-16 pages 98-99  - Research tasks page 99  - Key words page 100 |
| **Additional resources**  Biodiversity is Us app developed to support the United Nations Decade on Biodiversity 2011-2020.  <https://www.biodiversityisus.org/>  A short unit on classification published by ASTA.  <http://scienceweb.asta.edu.au/years-7-8/unit2/overview/yr78-unit2-overview.html>  The Atlas of Living Australia, a digital database of Australian species.  <http://www.ala.org.au> |