Reproducing

8.1 There are different ways of reproducing

Teacher notes (pages 140–141)

Introducing the chapter

This unit looks at the science of reproduction. It is important for students to realise that human reproduction only makes up one small part of this topic. In this section, students will learn about how other animals reproduce and how plants reproduce. There are also some terms that students may be unfamiliar with and could warrant some class discussion; these include gametes (sex cells, sperm and ovum), DNA (genetic information that is passed down and found in the nucleus of cells) and asexual reproduction – reproduction without a mate, forming an identical copy.

Teaching tips: Reproduction

Discussion of this in terms of humans or domestic animals may help students make connections with the concepts. Students should compare the different types of mammals and how their reproduction is different and how it is similar. Monotremes are likely to provide issues for students and could be used as a point of discussion. As an extension, students could investigate reproduction in other animals such as reptiles, fish, birds, amphibians and invertebrates. They could suggest why different reproductive systems exist and how they benefit the organism and its lifestyle.

Differentiation

For less able students:

Students may benefit from drawing the process of fertilisation, showing the uterus, ova and sperm, as a scientific diagram. This could also be drawn as flow chart.

For more able students:

Students may wish to explore the more advanced topic of meiosis. Meiosis is the cell division that occurs once the sperm and ovum form the zygote.

Additional activity: Hermaphrodites

Some students would have heard the term ‘hermaphrodite’ before. Some may consider this to be an abnormal condition that some humans have. Although it is true that some humans can be ‘true’ hermaphrodites, this is very rare. ‘True’ hermaphrodites have both male and female sex organs. Many students are intrigued by the idea that some organisms are hermaphroditic, especially animals. It is more common than many students realise, as is the ability of animals to change sex throughout their lives. The advantage of being a hermaphrodite is that genetic diversity is maintained and an individual can ‘switch’ genders to ensure survival of the species. For example, in some fish species, if not enough males are available, some of the females will change sex. It is important that students realise that hermaphrodites are very common in some plant and animal groups and that it is a normal function of reproductive capability. Garden snails are an example of a hermaphrodite; they have both male and female reproductive systems and so can be either, depending on the situation. Students could be asked to research such species and present the information to the class in a creative way.

Going further

A useful weblink is available on your obook/assess. To access it, click the weblink tile on the Dashboard for this unit.

**Human body systems: Reproductive system**  
This video provides an overview of female and male human reproductive systems.

8.2 The female reproductive system produces eggs in the ovaries

Teacher notes (pages 142–143)

Introducing the topic

This section focuses on the structures of the female reproductive systems and looks at functions such as menstruation, pregnancy and giving birth. The female reproductive system varies between vertebrates depending on the reproductive habits of the species.

Teaching tips: Different learning modes

Many videos and animations on reproductive systems can be found on the Internet. The use of anatomical models will assist visual and kinaesthetic learners. Students can also make their own models, or draw their own annotated posters.

Additional activity: Asking questions

Students may not feel comfortable asking questions about human reproduction. An option is for them to write any questions they have anonymously on a piece of paper and contribute it to a class question box. You can then read out and respond to each question without embarrassing the student who asked it.

Differentiation

For less able students:

Provide students with labels for diagrams, rather than relying on students remembering the names of the parts as well as where they go.

For more able students:

Students may wish to further investigate this topic by learning about menopause.

Additional activity: Brainstorm

Working in groups, ask students to brainstorm what they already know about the structure and function of the human reproduction systems and to identify some misconceptions.

Going further

A useful weblink is available on your obook/assess. To access it, click the weblink tile on the Dashboard for this unit.

**Reproduction, growth and development Internet resources**  
This website provides a range of resources, including videos and activities for teaching the human reproductive systems.

8.3 The male reproductive system produces sperm in the testes

Teacher notes (pages 144–145)

Introducing the topic

This section considers the male reproductive system. The vast majority of animals reproduce sexually. They are also sexually dimorphic, which means that males look physically different from the females. For baby animals to be born, there needs to be fertilisation of an egg by a sperm. This could happen inside the female or male (internal fertilisation) or out in the open (external fertilisation).

Differentiation

For less able students:

Provide less able students with images of different types of different animals and their young in order to discuss some of the differences in reproduction. Some examples to include could be platypus, echidna, reptiles and birds.

Ask students to draw the development of an adult frog in stages from spawn to adult.

For more able students:

More able students may wish to further investigate the reproductive systems of invertebrates. Invertebrates are not often considered when students are learning about reproduction, even though they make up 95% of all animals on Earth.

More able students could describe the benefits of each type of reproduction for the particular species.

Additional activity: See, Know, Wonder

See, Know, Wonder activities always involve a visual cue like a photo or video. Give students an image to consider, for example, a joey, the offspring of kangaroo. Students draw a three-column table and start by working individually, listing three things that they can see in the image, for example, an almost hairless body. They then complete the column for Know – what do they know when they look at the image? For example, ‘I know the joey has been born very recently’. The final column is Wonder – what does the image make them wonder? For example, how will the joey get from the birth canal to the pouch to feed? Students then pair up and, in a different coloured pen, add any See, Know, Wonder points that their partner had that were different from their own. This comparison can be repeated in different pairs or even among the whole class. See, Know, Wonder activities help students to develop observational skills as well as questioning and working with others.

Going further

A useful weblink is available on your obook/assess. To access it, click the weblink tile on the Dashboard for this unit.

**Healthdirect Australia: Male reproductive system**  
This website contains further information about the male reproductive system, including issues that can affect this system.

8.4 Things sometimes go wrong in reproduction

Teacher notes (pages 146–147)

Introducing the topic

There are many situations in which we wish to encourage reproduction. For example, when a human couple wants to have a baby and encounters difficulties, technology can intervene. When a species is threatened with extinction, technology can reduce the threat; when certain features or characteristics are favoured, humans step in to influence the outcome; and when reproduction is just not an option, something can be done to prevent it.

Teaching tips: Incursions

The RSPCA is a wonderful organisation that can often present to students on the importance of desexing pets, in particular, cats. RSPCA also offer excursions and visits to their sites, though booking ahead is definitely required.

Differentiation

For less able students:

Students could prepare a list and description of different types of contraception.

For more able students:

Students could prepare an essay on the use of IVF. Are there any negatives about using IVF? Should there be an age limit for IVF? How much does IVF cost?

Additional activity: Desex your pet!

Students could become involved in a campaign to communicate the importance of desexing family pets. This could take the form of presentations to other year levels, the creation of a video or even raising money for an organisation such as the RSPCA.

Additional activity: Debate

Students could debate the use of immunocontraceptive vaccines. Some populations of rabbits, foxes and mice have grown to the point of posing a serious threat to the natural environment. Some scientists have created immunocontraceptive vaccines to combat this issue. Immunocontraceptive vaccines render the target animals infertile. Is the use of these vaccines ethical? Why or why not? What other control methods could work on limiting the size of a population of introduced species?

Going further

A useful weblink is available on your obook/assess. To access it, click the weblink tile on the Dashboard for this unit.

**RSPCA: Desexing**  
This RSPCA website has great information about being a responsible pet owner, in particular, ensuring your pet is desexed.

8.5 Plant sexual reproduction produces seeds

Teacher notes (pages 148–149)

Introducing the topic

Flowers come in all shapes and sizes. A new concept for many students will be that the flower of a plant is actually where its reproductive organs are found. It is important that students are able to identify the stigma as the ovary. Pollination is where pollen attaches itself to the stigma and burrows down to the ovary. After fertilisation, the ovary swells and becomes a fruit.

Teaching tips: Examining a flower

Larger flowers are useful for clearly displaying a plant’s reproductive system. Lilies are perfect as they have simple structures, parts are clearly distinguished, and the size makes them easy for students to handle. Complex flowers such as sunflowers and daisies are good for comparisons, but the reproductive structures can be very difficult to identify. Grevilleas are good examples of complex flower heads and parts are easily identified.

Teaching tips: Types of flowers

Flowers can either be individual or arranged as inflorescences (clusters). The number of sepals and petals (monocots have their petals and sepals in multiples of three and dicots have multiples of four or five) often identifies individual flowers. Inflorescence flowers (like daisies) are actually made up of clusters of often tiny flowers. Flowers can also be perfect and hermaphroditic (contain both male and female parts) or imperfect (possessing either the male or female parts, but not both). ‘Male flowers’ are called staminate, ‘female flowers’ are called pistillate. Plants can also be hermaphroditic (with perfect flowers), monoecious (separate male and female flowers on the same plant) or dioecious (with either female or male flowers, but not both).

Differentiation

For less able students:

Students can use plasticine to make a three-dimensional model of the internal structure of a flower. The models can be placed at the centre of an A4 sheet of paper and labelled, using provided terms.

For more able students:

Students can classify flowers and plants using the terminology introduced in the ‘Teachings tips’ above.

Additional activity: Discussing flowers and pollinators

The literacy builder introduces the concept of flowers being used to attract pollinators. A class discussion about the types of flowers and the likely pollinators can be very interesting. The structure and colour of petals often indicate whether the pollinator is an insect or animal. Wind-pollinated plants, like grass, can also be discussed; these don’t have any petals or nectar to attract a pollinator because the pollen is small enough to be carried on the wind.

Additional activity: Model of a flower

Students can use plasticine to make a three-dimensional model of the internal structure of a flower. The models can be placed at the centre of an A4 sheet of paper and labelled.

Additional activity: Vegetative reproduction

Students select a plant to research, and a method for propagation. They propagate the plant and present their research concerning the plant, the method of propagation and the resulting new plant to the class. Examples of plants students could choose include strawberries, roses and gerberas.

Going further

A useful weblink is available on your obook/assess. To access it, click the weblink tile on the Dashboard for this unit.

**Label the diagram of plant & flower**  
This website contains an interactive of labelling the various parts of a plant and a flower.

8.6 Reproduction techniques have an impact in agriculture

Teacher notes (pages 150–151)

Introducing the topic

This topic discusses the use of selective breeding, loss of diversity and inbreeding. Many reproductive technologies are used in agriculture to improve desired characters in plants and animals. This has an impact on diversity and risks inbreeding.

Teaching tips: Zoo breeding programs

Zoos often advertise their breeding programs. This can usually be found on their website or by contacting the zoo. Conservation of species in zoos or similar is called ex-situ conservation, meaning conservation off-site or out of the natural habitat. We also preserve biodiversity by conserving the natural habitat of the animal. This method is called in-situ conservation, meaning conservation ‘in the natural habitat’. Ask students whether they think ex-situ or in-situ conservation is a better option. Does this change depending on the animal? What are the advantages/disadvantages of each method?

Additional activity: Selective breeding

Ask students to select an animal or plant that has been selectively bred and research it, including the reasons for selective breeding and any effects it has had.

Examples of selectively bred organisms:

• Bully whippet

• Transgenic marmosets (four individuals were implanted with the jellyfish gene)

• Belgium blue cow

• Carrots (in a variety of colours)

Additional activity: Excursion

This topic is a good opportunity to organise an excursion to a local waterway (for frog spawn), zoo or aquarium where students can further explore the types of reproduction of various animals.

Additional activity: Minute paper

At the end of this section/topic give students a small piece of paper (an eighth of an A4 page at the most) and ask them to summarise what they have learnt on this paper in one minute. This minute paper can allow you to gauge how well students understood the new concepts introduced and focus on aspects that they may benefit from revisiting at the start of the next lesson. Minute papers can have the students’ names on the back or handed in anonymously.

Going further

A useful weblink is available on your obook/assess. To access it, click the weblink tile on the Dashboard for this unit.

**RSPCA: What do the terms inbreeding and linebreeding mean?**  
This website provides further information about inbreeding, including the main risks and issues relating to inbreeding.