

LESSON PLANS



CONSERVATION EDUCATION

ALBATROSSES AND PETRELS

LESSON 1 The life of a seabird

LESSON 1 Overview

Curriculum connections

AUSTRALIA Science: *Science understanding* - Biological sciences. *Science inquiry skills* - Processing and analysing data and information; Communicating. **HASS:** *Inquiry and skills. Knowledge and understanding* - Geography; Civics and citizenship.

NEW ZEALAND Science: *Nature of Science; Living World; Planet Earth and Beyond.* **Social Sciences. Health and Physical Education:** *People and the Environment*

SOUTH AFRICA Natural Sciences and Technology: *Life and Living; Planet Earth & Beyond.* **Social Sciences:** *Geography* - Map skills; Weather, climate and vegetation of South Africa; Climate and vegetation around the world. **Life Skills:** *Personal and Social Well-being* - Social responsibility.

ENGLAND Science: *Living things and their habitats; Animals, including humans; Evolution and inheritance.* **Geography:** *Human and physical geography; Locational knowledge; Geographical skills and fieldwork.*

SCOTLAND Science: *Planet Earth* - Biodiversity and interdependence; Processes of the planet. *Biological systems* - Inheritance. *Topical science.* **Social Studies:** *People, place and environment.*

WALES Science; Humanities

NORTHERN IRELAND The World Around Us: *Geography* - Interdependence; Place. *Science and technology* - Interdependence; Change over time.

Keywords

Adaptation, Biodiversity, Evolution, Ecosystem, Endemic, Habitat, Life cycle, Migration

Time needed

40-60 minutes

Additional resources

Metre ruler or tape measure
Peak Beaks cards (to print on A4 and cut out)

LESSON 1 Lesson plan

1 5-10 minutes

Discussion: the ocean

Slide 2. Write 'the ocean' on the whiteboard in a mind map or use the presentation slide. Ask the students to discuss, in pairs what they know about the ocean, prompting:

- What lives there and examples of marine habitats
- Define 'marine ecosystem'
- Why the ocean is important for humans and the rest of the natural world
- What harms the ocean

Then, have a whole-class discussion about their ideas, adding to the mind map. Students add to the mind map on *page 1* of their **workbooks** from the discussion.

2 10 minutes

Activity and discussion: animal body parts and adaptations

Slide 3. Ask the students to name the animals on the slide and their body parts, prompting discussion about: what the animal uses the body part for, how they use it, and why they have it - based on the habitat this animal can be found in. Discuss the odd-ones-out (*owl, butterfly*), prompting: which ones don't belong in the marine ecosystem and why, and what adaptations they would need to live here.

Slides 4 & 5. Repeat this discussion for migratory birds. Discuss the odd-ones-out (*parrot, pigeon*). Introduce the concept of migration.

Slides 6-21. Present on the evolution, body parts and adaptations of albatrosses and petrels. Work through slides 7-21 as a class, asking the students to figure out what body part each picture shows, what adaptations are associated with that body part, and the uses of that adaptation, revealing the answers on the slides.

On *page 2* of their **workbooks**, students can write three facts they have learnt about seabird adaptations.





3 5-10 minutes Activity: make a wandering albatross

Slide 22. Introduce the Wandering Albatross as the largest seabird on Earth, with the largest wingspan of all birds on Earth. Using rulers or a tape measure, show the wingspan and body length of the Wandering Albatross. Ask for volunteers to line up, with their arms out, until they make the length of the wingspan. Do the same for the body length, creating a cross formation to represent the size of the Wandering Albatross.

Ask the students to consider why they think this bird needs such big wings, and how they might use them, referring back to slide 21. For perspective, the students could measure their own armspans and heights, the wingspan and body length of a familiar national bird, or the body length of another animal.

On *page 2* of their **workbooks**, students write down the size of a Wandering Albatross, and the number of students needed to create its wingspan and body length.

4 20-30 minutes Game: Peak Beaks (biology and ecology fact cards)

Slide 23 & 24. There are 35 cards in total, which provide information on all 31 ACAP-listed albatross and petrel species, and 4 additional cards of other animals for comparison. Play until 5-10 minutes before the end of the Lesson.

- Shuffle the deck and divide it evenly between students, so that everyone has at least 3 cards. If there are not enough cards to play as a whole class, print multiple card decks and divide the class into groups to play separate games. The first person reads out the highest value on their card alongside its category, and each person takes it in turns reading out their value for that category. The highest value wins that round, and receives all played cards for that round.
- Whilst playing, encourage discussion about what they think the categories mean (see Fact File for definitions), comparisons to other animals they know, and their thoughts on the information on the cards.
- If there is a range (e.g. *Atlantic Yellow-Nosed Albatross - Adult population: 35,000-73,500*) choose the highest value. Some values will say 'unknown', as there is a lack of research around this species. Use this as an opportunity to note there is uncertainty surrounding many things in science, particularly with isolated species such as these seabirds as they are difficult to access and research.
- After play has finished, the whole class works together to fill in the blanks on the presentation slide 9 for the winning values and species of each category, including the measurements (kg, cm, etc) (N.B. whilst penguins are a seabird, these questions relate only to albatrosses and petrels). Encourage students to convert values into different measurements, decimals and fractions, and to manipulate the data, such as by calculating averages. The answers to slide 9 are:

The seabird with the longest wingspan, which is 360 cm, is the Wandering Albatross.

The seabird with the longest body, which is 120 cm, is the Wandering Albatross.

The seabird with the longest generation length, which is 44 years, is the Light-mantled Albatross.

The seabird with the oldest first breeding age, which is 12 years old, is the Antipodean, Buller's, Light-mantled, Sooty, Southern Royal, and Wandering Albatross.

The seabird with the largest population, which is 3 million, is the White-chinned Petrel.

The seabird with the most breeding territories, which is 9, is the Southern Giant Petrel.

The heaviest seabird, which weighs 10 kg, is the Wandering and Southern Royal Albatross.

After play has finished, ask the students to choose the card of their favourite albatross or petrel species. On *page 3* of their **workbooks**, they record the values and key facts about this species. They may also draw the species at the bottom of the page.

LESSON 1 Extension and homework activities

E 40-60 minutes Case study research activity extension: The life of a seabird

Slide 25. The students work in groups to create visual profiles of one national species of albatross or petrel from the provided list of **case studies** on the next page - these case studies are national breeders to each territory. The profile could be in the form of a poster or comic, and should include a labelled drawing of their species - they can use *page 4* of their **workbooks** to make research notes, and *page 5* for planning their posters or drawings. Encourage them to convert data into different measurements, decimals and fractions - they could also create graphical representations of their data. Each group should prepare a short presentation of their visual profile. To conduct their research, the students should use information from the Fact Files. The profiles should include:

- 1) *Physical characteristics*, including identification features and adaptations
- 2) *Locations*, including breeding sites and migration routes
- 3) *Life cycle*



E continued... Case study research activity extension: The life of a seabird

- 4) Diet
- 5) Threats and conservation
- 6) Adult population, including population trends

Students record the information presented by other groups on page 6 of their **workbooks**.

Case studies:

- **New Zealand:** Light-mantled albatross, Northern Royal Albatross, Grey-headed Albatross
- **South Africa:** Wandering Albatross, Light-mantled Albatross, Grey-headed Albatross
- **United Kingdom:** Spectacled Petrel, Tristan Albatross
- **Australia:** Wandering Albatross, Grey-headed Albatross, Light-mantled Albatross, Shy Albatross

Additional resources:

- Drawing equipment and paper
- Computers or tablets for research (optional)

Additional extension option: This activity could instead be carried out after Lessons 2, 3 or 4. This would allow for a more complete research project, into threats and conservation in particular.

H Homework: Migration challenge quiz

Consulting the Fact Files and what they have learnt in the lesson, the students complete the quiz on pages 7-10 their **workbooks**. Round 3 requires them to mark a location on the provided map - they may need to use an atlas or Google Earth for this. The questions and answers are provided below.

Round 1 - how do I fly?

a) Albatrosses and petrels go on long trips over the ocean to find food. They can travel further than any other bird without returning to land - what distance is that?

Answer: 16,000 kilometres

b) What 2 types of soaring do albatrosses and petrels use to travel large distances over oceans in rough winds

Answer: Dynamic soaring and slope soaring

c) How many kilometres per day can some albatrosses and petrels travel without flapping their wings, using only soaring?

Answer: 1000 kilometres

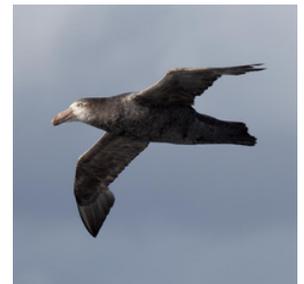
Round 2 - Who am I? Name the species. One of these birds is not migratory or an albatross or petrel - can you figure out which one?



Answer: Wandering Albatross



Answer: Grey-headed Albatross



Answer: Northern Giant Petrel



Answer: White-chinned Petrel



Answer: Pigeon (non-migratory)



Answer: Light-mantled Albatross



Round 3 - Where do I breed? Write the breeding territory / territories of each species. Mark and label the location on the map.

d) Wandering Albatross

Answer: Macquarie Island (Australia); French Southern Territories; Prince Edward Islands (South Africa); South Georgia (Islas Georgias del Sur)*

e) Light-mantled Albatross

Answer: Macquarie Island, Heard and McDonald Islands (Australia); Auckland Islands, Campbell Islands, Antipodes Islands (New Zealand); French Southern Territories; Prince Edward Islands (South Africa); South Georgia (Islas Georgias del Sur)*

f) Grey-headed Albatross

Answer: Macquarie Island (Australia); Campbell Islands (New Zealand); Prince Edward Islands (South Africa); South Georgia (Islas Georgias del Sur); Chile; French Southern Territories

g) Northern Giant Petrel

Answer: Macquarie Island (Australia); Auckland Islands, Campbell Islands, Antipodes Islands, Chatham Islands (New Zealand); Prince Edward Islands (South Africa); South Georgia (Islas Georgias del Sur)*; French Southern Territories

h) White-chinned Petrel

Answer: French Southern Territories; Auckland Islands, Campbell Islands, Antipodes Islands (New Zealand); Prince Edward Islands (South Africa); South Georgia (Islas Georgias del Sur)*

i) Balearic Shearwater

Answer: Balearic Islands (Spain)

j) Southern Royal Albatross

Answer: Campbell Islands, Auckland Islands, Taiaroa Head (New Zealand)

k) Black-browed Albatross

Answer: Chile; Falkland Islands (Malvinas)*; French Southern Territories; Heard and McDonald Islands; Macquarie Island (Australia); Campbell Islands, Antipodes Islands (New Zealand); South Georgia (Islas Georgias del Sur)*

l) Shy Albatross

Answer: Albatross Island, Pedra Branca and the Mewstone (Australia)

Round 4: Where do I fly?

m) Where does the Southern Royal Albatross fly to get food during the non-breeding season?

Answer: The west and east coast of South America

n) Which continent do both the Wandering Albatross and Grey-headed Albatross circumnavigate (travel all the way around) between breeding seasons?

Answer: Antarctica

o) How many times does the Wandering Albatross circumnavigate Antarctica in a year during non-breeding? There are two possible answers to this question.

Answer: 2 or 3

p) What distance does a Wandering Albatross cover in a non-breeding year by circumnavigating Antarctica?

Answer: 120,000 kilometres

q) Where do 20% of Shy Albatrosses migrate to after breeding?

Answer: They travel across the Indian Ocean to seas off South Africa and Namibia.

r) Where do the majority of Black-browed Albatrosses breeding on South Georgia (Islas Georgias del Sur)* migrate for winter?

Answer: South African waters

s) Which petrel species breeds on Auckland Islands and Antipodes Islands (New Zealand) and winters off the coast of Peru, Ecuador and northern Chile?

Answer: White-chinned Petrel

t) Which albatross species forages the furthest south?

Answer: Light-mantled Albatross

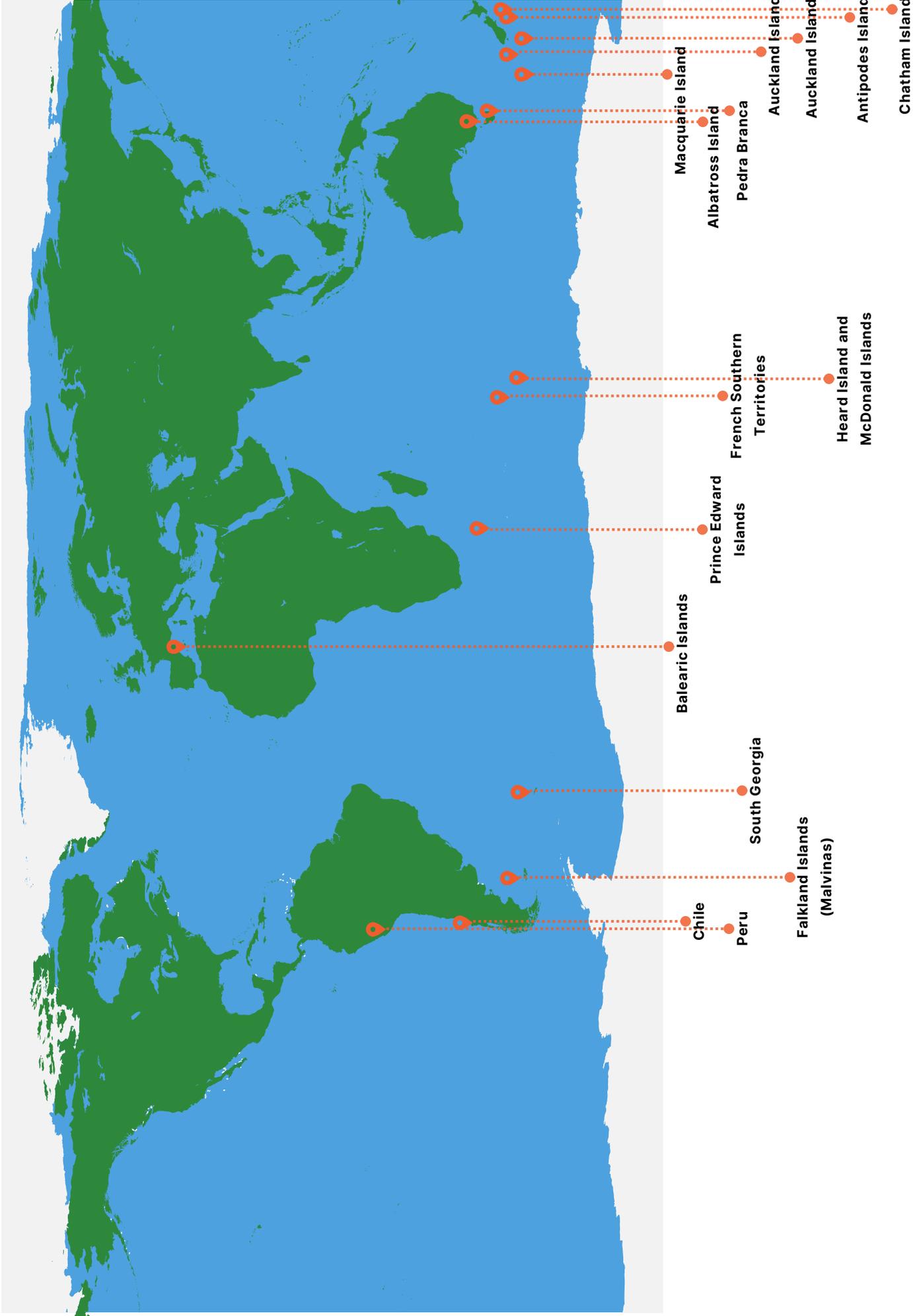
u) Which of the above species migrates the furthest north?

Answer: Balearic Shearwater

LESSON 1 The life of a seabird



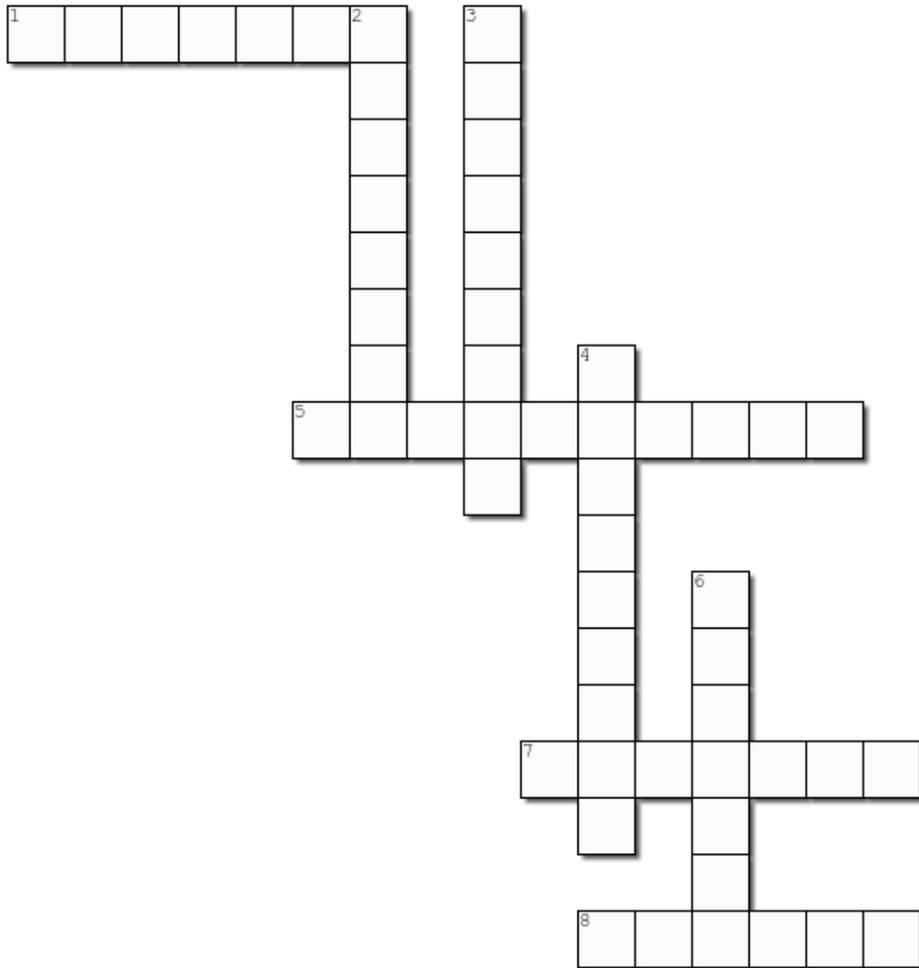
Map label answers for Round 3





H Homework: Seabird biology and ecology crossword

Consulting the Fact Files and what they have learnt in the Lesson, the students complete the crossword on *page 11* of their **workbooks**.



Across

1. The place where living things naturally live and grow
5. The Light-mantled Albatross has the longest _____ length of all albatrosses and petrels, of 44 years
7. The Spectacled Petrel is _____ to the Tristan da Cunha islands - it does not breed anywhere else
8. The oldest bird in the world, which was 71 in 2023, is a _____ Albatross

Down

2. The type of bill albatrosses and petrels have, allowing them to detect food from many kilometres away in the ocean
3. A community of living, such as animals and plants, and non-living things, such as water and air, interacting with each other
4. The _____ Albatross has the longest wingspan of all birds on Earth
6. The ocean covers _____ percent of Earth's surface

Answers:

Across:

- 1) *habitat*
- 5) *generation*
- 7) *endemic*
- 8) *Laysan*

Down:

- 2) *tubenose*
- 3) *ecosystem*
- 4) *Wandering*
- 6) *seventy*

LESSONS 2, 3 & 4

- The following 3 Lessons cover the main challenges albatrosses and petrels face, and their solutions.
- Teachers can choose to complete any number of these Lessons. However, we recommend teaching them in order as some of the material builds on each other over the Lessons.
- Each of the 3 Lessons start with the same step **1** (see below), a 5-minute discussion and reflection activity, which can be adapted for the topic of focus for that Lesson.

1 5 minutes
Discussion: threats to albatrosses and petrels

Using the presentation slide with image prompts on the threat of focus for that Lesson (**slide 2 of presentations 2, 3 and 4**), have a class discussion about the images, prompting: what they think the pictures show, what they think causes the threat they see in the pictures, what problems might it cause for albatrosses, petrels, other animals and the planet, and how they feel looking at the picture. Ask the students to imagine they are the animal in the picture, prompting: how they would feel in that situation, and what they would do. Ask them what they think people could do to stop this from happening.

LESSON 2 Fishing and food webs

LESSON 2 Overview

Curriculum connections

AUSTRALIA Science: Science understanding - Biological sciences; Earth and space sciences. *Science as a human endeavour* - Nature and development of science; Use and influence of science. *Science enquiry skills* - Processing and analysing data and information; Communicating. **HASS:** *Inquiry and skills. Knowledge and understanding* - Geography; Civics and citizenship; Economics and business. **Drama. Design and technologies**

NEW ZEALAND Science: *Nature of Science; Living World; Planet Earth and Beyond.* **Social Sciences. The Arts:** *Visual Arts; Drama.* **Health and Physical Education:** *People and the Environment*

SOUTH AFRICA Natural Sciences and Technology: *Life and Living; Planet Earth & Beyond.* **Social Sciences:** *Geography* - Physical features of South Africa; Trade. **Life Skills:** *Personal and Social Well-being* - Social responsibility. **Creative Arts** - Visual Arts; Performing Arts

ENGLAND Science: *Living things and their habitats; Animals, including humans; Evolution and inheritance; Forces.* **Geography:** *Human and physical geography; Locational knowledge.* **Design and Technology.**

SCOTLAND Science: *Planet Earth* - Biodiversity and interdependence; Processes of the planet. *Forces, electricity and waves* - Forces. *Biological systems* - Body systems and cells. *Topical science.* **Social Studies:** *People, place and environment.* **Technologies:** *Technological developments in society and business; Craft, design, engineering and graphics.* **Expressive Arts:** *Drama.* **Health and Well-being:** *Food and health* - Food and consumer

WALES Science; Humanities; Expressive Arts

NORTHERN IRELAND The World Around Us: *Geography* - Interdependence; Change over time. *History* - Interdependence. *Science and technology* - Interdependence; Change over time; Movement and energy. **The Arts:** *Drama*

Keywords

Food web, Trophic level, Bycatch, Photosynthesis, Ecosystem services

Time needed

45-60 minutes

Additional resources

- 10 small pieces of paper
 Ball of string
 Scissors and tape to construct props
 Props to act out fishing and bycatch mitigation methods, e.g.:
- Longline - rope or string
 - Longline hooks - paper clips attached to rope or string
 - Trawl warps - sticks
 - Trawl nets - carrier bag or net packaging
 - Bird-scaring lines - ribbons attached to rope or string
 - Bird curtain - ribbons attached to sticks
 - Hookpod - water bottle or bubble wrap, encasing paper clips (longline hooks) and bait
 - Bait - drawing equipment and paper to draw bait e.g. fish, squid, crabs



2 10 minutes**Discussion and activity: animal diet and food webs**

Slides 3-10. Have a discussion about animal diets. Work through the slides as a class, asking the students to figure out what diet each animal has, revealing the answers on the slides.

Slide 11. Explain that albatrosses are predators, mainly eating fish, cephalopods (squid, octopus), and crustaceans (crabs, shrimp).

Slides 12-15. Reflecting on their knowledge of animal diet and ecosystems, discuss what a food web is. Work through the slides as a class, figuring out the diets and trophic levels of the food web on the slide, and who eats whom. Reveal the answers, and have a class discussion, prompting: what the different trophic levels mean, and the importance of each trophic level to each other. Introduce the idea of ecosystem services, discussing where our food comes from, how we share our food and ecosystems with other animals, how the ocean provides us with food and fishery workers with jobs, and how human activity can affect food webs and ecosystems.

Students complete the food web on *page 12* of their **workbooks**, drawing arrows between who eats whom and labelling trophic levels and diets. They write the meaning of the words on *page 13* of their **workbooks**, and give examples of each (see pages 4 and 8 of the Fact File for potential answers).

3 10-15 minutes**Discussion: fishing practices, bycatch and bycatch mitigation methods**

Slides 16 & 17. Explain how albatrosses and petrels find and catch their food.

Slides 18-22. Compare this with humans, introducing the idea that we catch our food from the sea using different methods.

Explain how trawl and longline fishing works, using props if desired. Have a class discussion about the benefits of fishing for humans, and then ask what problems fishing might cause for other animals.

Slide 23. Introduce the idea of bycatch, explaining how non-target species (not fish or seafood) are caught in trawl and longline fisheries.

Slide 24. Introduce bycatch mitigation methods. Explain how they work, using props if desired, and discuss why they are needed, giving real-life examples of their success.

Students fill in *page 14* of their **workbooks**, naming two types of fishing methods, defining bycatch and naming four types of bycatch mitigation methods from the slides.

4 20-30 minutes**Game: food web of a Grey-headed Albatross**

In this game, the students physically recreate the food web of the Grey-headed Albatross, a species that breeds in territories of all four countries. Return to slide 15 for guidance. Firstly, write the following words on separate pieces of paper:

- | | |
|--------------------------|---------------------|
| 1. Grey-headed albatross | 6. Zooplankton |
| 2. Squid | 7. Sun |
| 3. Fish | 8. H ₂ O |
| 4. Krill | 9. CO ₂ |
| 5. Phytoplankton | 10. Human |

Ask for 10 volunteers, getting them to stand in a circle, with other students observing. Hand one of the pieces of paper to each student, and ask them to read it out to the rest of the class. The student with the Grey-headed Albatross paper holds the end of a ball of string, passing it to another they think they have a link with, asking them to say why they passed it to them. Continue until all 10 have held the string. Ask: what does the food web show?

Whilst these students keep hold of the string, ask the rest of the class to read out scenarios that might affect the food chain, asking the students holding string to wiggle it if they think it affects them and to say how, and what the effect on other organisms is. Scenarios might include:

- Adding a non-seabird friendly fishery to the marine ecosystem
- Adding a seabird friendly fishery to the marine ecosystem
- Adding island pests (invasive species) to their breeding habitat
- Removing fish due to overfishing or climate change.

Have a class discussion, prompting:

- What different trophic levels mean, the importance of each level to each other
- How humans get fish and seafood, discussing the concept of interconnectedness in ecosystems, and how we share our food and ecosystems with seabirds
- Impact of threats such as island pests, overfishing, climate change, non-seabird friendly fisheries on food webs
- Impact of bycatch mitigation methods and sustainable fishing practices.





4 continued... Game: food web of a Grey-headed Albatross

Students complete *page 15* of their **workbooks**, writing three things that can positively or negatively affect the food web of a Grey-headed Albatross, explaining how it affects it. Example answers include:

- *Island pests - negatively affects the food web as they prey on seabird chicks, eggs and adults, reducing their population*
- *Overfishing - negatively affects the food web by reducing food availability for seabirds and other species*
- *Sustainable fishing - positively affects the food web by maintaining or increasing food availability for seabirds and other species*
- *Climate change - negatively affects the food web by increasing island pest populations, destroying seabird habitats and reducing food availability in the ocean*
- *Non-seabird friendly fisheries or bycatch - negatively affects the food web by reducing seabird populations*
- *Bycatch mitigation methods - positively affects the food web by maintaining or increasing seabird populations*

LESSON 2 Extension and homework activities

E 45-60 minutes

Research and role play activity extension: reducing bycatch in commercial fisheries

Slide 25. Divide the class into small groups, and assign them a species from the provided list of **case studies** on this page - these case studies are either national breeders to each territory (*B*), or migrate over territorial waters (*M*).

Each group pretends they are co-captains of a commercial fishing boat in the Southern Ocean. The groups prepare a short (1 to 2 minute) role play presentation, whereby they teach their fishing crew (the rest of the class) about bycatch mitigation methods for the fishing method that threatens their assigned species. They use the Fact File to find out what kind of fishing practice threatens their species, and their relevant behaviours or biological characteristics (e.g. diet, migration route, nocturnal, diurnal), to figure out the best mitigation methods. They can use *page 16* of their **workbooks** to write planning notes, and *page 17* to plan their props or visual aids. Leave enough time at the end of the session for each group to perform their role plays.

In the role play, they should:

- Teach the audience how their current fishing method works, and how the new bycatch mitigation methods they want to implement work, using props to demonstrate (see Resources).
- Argue why the change is needed i.e., the benefits it will bring to the seabirds. They should use data from the Fact File as evidence of the current population effect of bycatch to their species, and where and how this change has worked before in real-life fisheries.
- Use other visual aids, for example: species drawings, maps of fisheries and seabird migration routes, posters with statistics or graphical representations of evidence.

Whilst observing the other groups' role plays, students record information about the species, old and new fishing practices, why the change is needed, and where and how it has succeeded before, on *page 18* of their **workbooks**.

Additional resources

Props to act out fishing and bycatch mitigation methods, e.g.:

- Longline - rope or string
- Longline hooks - paper clips attached to rope or string
- Trawl warps - sticks
- Trawl nets - carrier bag or net packaging
- Bird-scaring lines - ribbons attached to rope or string
- Bird curtain - ribbons attached to sticks
- Hookpod - water bottle or bubble wrap, encasing paper clips (longline hooks) and bait
- Bait - drawing equipment and paper to draw bait e.g. fish, squid, crabs

Scissors and tape to construct props

Drawing equipment and paper for other visual aids

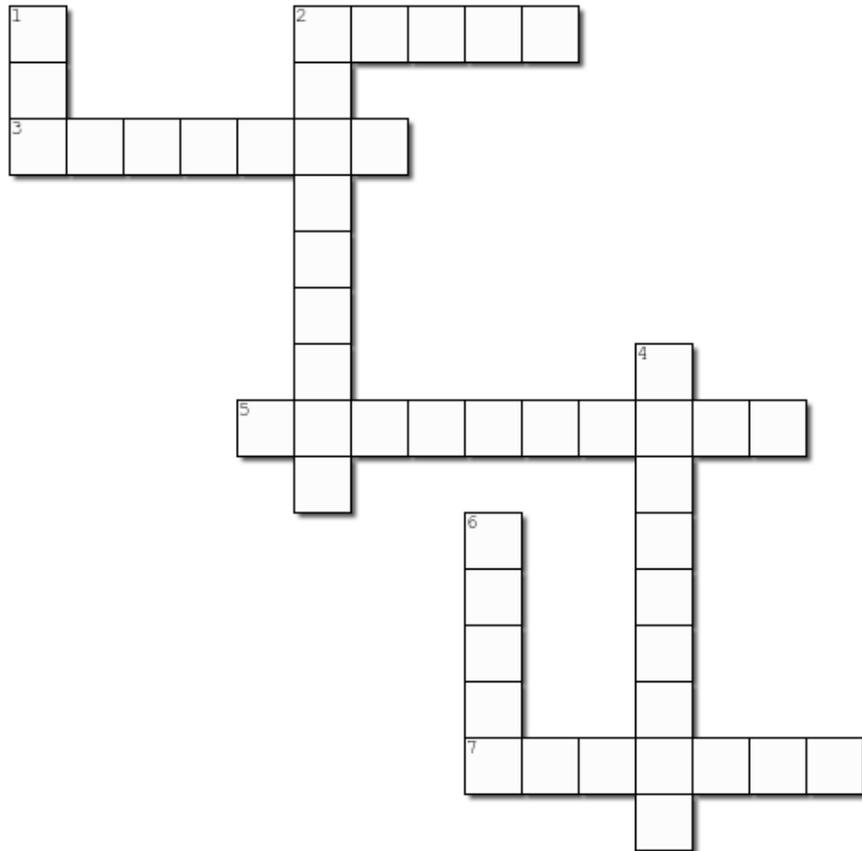
Case studies:

- **New Zealand:** Antipodean Albatross (*B*), Grey-headed Albatross (*B*), Indian Yellow-nosed Albatross (*M*), Black-browed Albatross (*B*), White-chinned Petrel (*B*)
- **South Africa:** Grey-headed Albatross (*B*), Black-browed Albatross (*M*), Indian Yellow-nosed Albatross (*B*), Tristan Albatross (*M*), White-chinned Petrel (*B*)
- **United Kingdom:** Tristan Albatross (*B*), Balearic Shearwater (*M*)
- **Australia:** Antipodean Albatross (*M*), Grey-headed Albatross (*B*), Indian Yellow-nosed Albatross (*M*), Black-browed Albatross (*B*), White-chinned Petrel (*M*)



H Homework: Fishing and food webs crossword

Consulting their Fact Files and what they have learnt in the Lesson, the students complete the crossword on *page 19* of their *workbooks*.



Across

2. ____-setting is one method to reduce seabird bycatch in longline fisheries - it is effective for birds that forage in the day
3. The accidental capture of an animal, such as an albatross or petrel, by commercial fishing boats
5. Some birds are herbivores as they only eat plants. Albatrosses and petrels are ____ as they only eat other animals
7. Bird-____ lines is one method used to reduce the number of seabirds caught in trawl and longline fisheries

Down

1. A group of food chains in an ecosystem is called a food ____
2. The white-chinned petrel is ____ - it forages at night time
4. Photosynthesis is carried out by primary ____
6. Island ____ such as mice and cats, which predate on seabird chicks, can affect the food web and seabird populations

Answers:

Across:

- 2) *night*
- 3) *bycatch*
- 5) *carnivores*
- 7) *scaring*

Down:

- 1) *web*
- 2) *nocturnal*
- 4) *producers*
- 6) *pests*

LESSON 3 Plastic pollution

LESSON 3 Overview

Curriculum connections

AUSTRALIA Science: *Science understanding* - Biological sciences; Chemical sciences. *Science as a human endeavour* - Use and influence of science. *Science enquiry skills* - Processing and analysing data and information; Communicating. **HASS:** *Inquiry and skills. Knowledge and understanding* - Geography; Civics and citizenship. **Design and technologies; Visual Arts**

NEW ZEALAND Science: *Nature of Science; Living World; Planet Earth and Beyond; Material World.* **Social Sciences. The Arts:** *Visual Arts.* **Health and Physical Education:** *People and the Environment*

SOUTH AFRICA Natural Sciences and Technology: *Life and Living; Planet Earth & Beyond; Matter and Materials.* **Social Sciences:** *Geography* - Map skills; Physical features of South Africa. **Life Skills:** *Personal and Social Well-being* - Social responsibility. *Creative Arts* - Visual Arts

WALES Science; Humanities; Expressive Arts; Health and Well-being

ENGLAND Science: *Living things and their habitats; Animals, including humans; Properties and changes of materials.*

Geography: *Human and physical geography; Locational knowledge; Geographical skills and fieldwork.* **Design and Technology; Art and Design**

SCOTLAND Science: *Planet Earth* - Biodiversity and interdependence. *Materials* - Properties and uses of substances; Chemical changes. *Topical science.* **Social Studies:** *People, place and environment.* **Technologies:** *Technological developments in society and business; Craft, design, engineering and graphics.* **Expressive Arts:** *Art and design.* **Health and Well-being:** *Food and health* - Food and consumer. *Planning for choices and challenges*

NORTHERN IRELAND The World Around Us: *Geography* - Interdependence; Place; Movement and energy. *Science and technology* - Interdependence; Place; Change over time; Movement and energy. **The Arts:** *Art and design*

Keywords

Plastic, Degradation, Food web, River mouth, Sea

Time needed

45-60 minutes

Additional resources

Drawing equipment and paper
Computers or tablets for students (optional)

LESSON 3 Lesson plan

2 10 minutes Discussion: causes and effects of plastic pollution

Slides 3-10. Introduce the threat of plastic pollution to the marine ecosystem, and the degradation timeline, working as a class to fill in the blanks on the slides.

Slides 11-13. Tell the students that marine litter can come from both land and ocean sources. Have a class discussion about the top litter items found in the ocean and their sources.

Slide 14. Split the class into small groups, and ask each group to make a list, on *page 20* of their **workbooks**, of plastic items they use, or that are found in their home and in school, and the sources they believe they come from. Then ask the groups to read out their list, and write a class list on the board.

Slides 15 & 16. Explain the issues plastic pollution causes for seabirds, other animals and humans through the food web. Slide 16 shows the whole water bottle that was found in the stomach of a Southern Royal Albatross on Whirinaki Beach in New Zealand. Students write the three main effects of plastic pollution (slide 15) on *page 20* of their **workbooks**.

3 5-10 minutes Activity: My Plastic Planet

Slide 17. On the smartboard or projector, or in pairs using computers or tablets, use Google Earth to find your town or city. Locate the nearest river and find where it meets the sea.

Students fill in the activity worksheet on *page 21* of their **workbooks**, including:

- Name and coordinates of town or city
- Name and coordinates of nearest river
- Distance from the centre of town to the nearest river
- Distance from the centre of town to the river mouth
- Name of the sea the river feeds into
- Name of the ocean nearest to the town

To visualise this information, the teacher could draw a map on the board of the route plastic takes from your town to the ocean.



25-35 minutes

Discussion and activity: solutions and campaign against plastic pollution

Slides 18 & 19. Referring back to the class list of plastic items and their sources, ask the students to think of things they could do to reduce oceanic plastic pollution. Develop on their ideas by explaining the known solutions to plastic pollution (slide 19).

Slide 20. Split the class into small groups, and ask each group to create a local campaign plan around one of the main litter items found in the ocean. They should use the Fact Files to conduct their research, and online resources if possible. They can use *page 22* of their **workbooks** to make planning notes, and *page 23* to plan their visual aids. The campaign should address:

- The source(s) of this litter item
- The harm it causes to albatrosses, petrels, other marine animals and humans
- What changes could be made to reduce its use and its harm to animals

They should create a poster to promote the campaign in your local community, including information on the above points, and a labelled drawing of one of the three albatross or petrel species threatened by plastic pollution from the **case study** list on this page. Encourage the students to include graphical representations of data from the Fact Files associated with the effects of plastic pollution.

Case studies:

- Laysan Albatross
- Southern Royal Albatross
- Black-browed Albatross

LESSON 3 Extension and homework activities



Extension: campaign against plastic pollution

The campaign project in step **4** could be made into a competition, with the winners presenting to the rest of the school and/or putting their posters up in the local community.



Extension: Plasticycle competition

The creations made with the reused pieces of plastic for the homework (*see below*) could be made into a competition, with the winners having theirs displayed in school with the accompanying poster.



Homework: Plasticycle project

The students collect 3 - 5 items of plastic from outside in their local area, and record on *page 24* of their **workbooks**:

- What the items are, including a drawing of the items
- Where and when they found them
- What they think is the source of these items

They should then clean and reuse the plastic to make an art piece or something useful. An **optional extension** to this homework could be to draw an accompanying poster to their creation, which includes information on the above three points that they wrote in their workbooks, a labelled drawing of one of the three albatross or petrel species threatened by plastic pollution from the list of **case studies** in step **4** (*above*), and two or three sentences on why it is important to reduce plastic pollution for the benefit of the ocean, albatrosses, petrels and other animals, including humans.

LESSON 4 Climate change

LESSON 4 Overview

Curriculum connections

AUSTRALIA Science: *Science understanding* - Biological sciences; Chemical sciences; Earth and space sciences; physical sciences. *Science as a human endeavour* - Use and influence of science; Nature and development of science. *Science enquiry skills* - Processing and analysing data and information; Communicating. **HASS:** *Inquiry and skills. Knowledge and understanding* - Geography; Civics and citizenship; Economics and business. **Media Arts; Drama**

NEW ZEALAND Science: *Nature of Science; Living World; Planet Earth and Beyond; Material World. Social Sciences. The Arts: Drama. Health and Physical Education: People and the Environment*

SOUTH AFRICA Natural Sciences and Technology: *Life and Living; Energy and Change; Planet Earth & Beyond; Matter and Materials. Social Sciences: Geography* - Physical features of South Africa; Weather and climate of South Africa; Trade; Climate and vegetation around the world; Population. **Life Skills:** *Personal and Social Well-being* - Social responsibility. *Creative Arts* - Performing arts

ENGLAND Science: *Living things and their habitats; Animals, including humans; Properties and changes of materials; Earth and space. Geography: Human and physical geography; Place knowledge; Locational knowledge; Geographical skills and fieldwork*

SCOTLAND Science: *Planet Earth* - Biodiversity and interdependence; Energy sources and sustainability; Processes of the planet. *Materials* - Earth's materials. *Topical science. Social Studies: People, place and environment. Technologies: Digital literacy; Technological developments in society and business. Expressive Arts: Drama. Health and Well-being: Food and health* - Food and consumer. *Planning for choices and challenges*

NORTHERN IRELAND The World Around Us: *Geography* - Interdependence; Place; Movement and energy; Change over time. *History* - Interdependence; Change over time. *Science and technology* - Interdependence; Place; Change over time; Movement and energy. **The Arts: Drama**

WALES Science; Humanities; Expressive Arts; Health and Well-being

Keywords

Climate, Greenhouse effect, Fossil fuels, Island pests, Carbon footprint

Time needed

50-60 minutes

Additional resources

Drawing equipment and paper
Computers or tablets for students (optional)

LESSON 4 Lesson plan

2 10 minutes

Discussion: introducing climate change and its effects

Slide 3. Write 'climate change' on the whiteboard in a mind map or use the presentation slide. Building on from step 1, ask the students to discuss in pairs what they know about climate change. Have a class discussion about their ideas, adding to the mind map. Prompt discussion about:

- How could you define climate change
- What effects climate change has on the environment - what it looks like in the world around them
- What causes it
- What effects it has on animals, the ocean and humans

The students complete the mind map on *page 25* of their **workbooks**.

Slides 4-7. Building from the discussion, work through the slides as a class, discussing the effects of climate change on albatrosses and petrels. Students fill in *page 26* of their **workbooks**, writing three ways that climate change affects albatrosses and petrels.



3 10-15 minutes
Discussion and activity: causes of climate change

Slides 8-11. Ask the students what they think causes climate change, and introduce the key causes on slide 9. Explain how humans need to take materials from the environment and produce energy to live, but this can have a detrimental effect on the planet if it is not done sustainably. Introduce the concept of fossil fuels and the greenhouse effect, explaining how using more energy leads to more emissions and increases the effects of climate change.

On page 26 of their **workbooks**, students write a short paragraph of what they have done that day and how they think their activities relate to energy consumption and climate change, and which causes on slide 9 it relates to. Draw connections between their activities, industry and the climate change crisis as a whole. Write a class list on the board of their daily activities that might cause climate change.

4 25-30 minutes
Discussion and activity: solutions to climate change

Slide 12. Using the compiled list from step **3**, ask students to discuss, in pairs, what they, their families, schools and companies could do differently to reduce energy consumption and climate change. Have a class discussion about their ideas, discussing whether these changes are possible, and whose responsibility it is to make these changes.

Slide 13. Introduce solutions to climate change.

Slide 14. In small groups, ask the students to choose up to 5 solutions from their discussion or the Fact File. Each group makes a plan for how they would implement these changes into their lives or how they would get others to implement them. They should include why they are implementing this change, and what positive effects it would have for albatrosses and petrels, the ocean, other animals and humans. Encourage the students to include graphical representations of data associated with climate change. They should prepare a short presentation on their plan, to present to the class in groups at the end of the lesson. Encourage them to use visual resources, such as a poster, comic, presentation or role play. They can use page 27 of their **workbooks** to make planning notes, and page 28 for planning visual aids.

LESSON 4 Extension and homework activities

E 60-75 minutes
Extension activity: create a news report

In groups, create a news report from the perspective of an Antarctic explorer. Choosing a species that is threatened by climate change from the list of **case studies** on this page, they report on:

- Where they are in the world, using a map
- The effects of climate change they are seeing in the environment and the species, including statistics. Encourage the students to include graphical representations of data associated with climate change.
- What changes can be made by people watching their news programme to reduce these effects

To research these topics, they can use their Fact Files, what they have learnt in class, and online resources if possible. They can use page 29 of their **workbooks** to make planning notes, and page 30 to plan the visual element of their reports. The news report could be 5-10 minutes long, whereby they can perform it as a role play to the class or record it using a camera.

Additional resources (optional, depending on the format chosen for the news reports):

- Video camera
- Computer or tablet with video editing software
- Computer or tablet with presentation software
- Props

Case studies:

- Grey-headed albatross
- Black-browed albatross
- Laysan albatross
- Northern royal albatross

Additional extension option: *If Lesson 2 and/or 3 have also been completed, the students could include additional threats to their species in their news report. They would then follow the same steps as above, including the effects of all threats to this species and what changes can be made to reduce them.*

H Homework: write a story from the perspective of a seabird

On pages 31-32 of their **workbooks**, the students write a story from the perspective (in the first person) of a species of their choice from the provided list of **case studies** in the extension activity (*see above*) that is affected by climate change. They should first write a short profile, based on the information from their Fact Files and what they have learnt in the Lessons. They should then explain the challenges they are facing as a result of climate change, and how it makes them feel. On page 33 of their **workbooks**, they should draw a visual element, such as a 'self-portrait' of their species, or a drawing representing the effect of climate change on their species.



H Homework: climate change quiz

Consulting the fact files and what they have learnt in the lesson, the students complete the quiz on pages 34-36 of their workbooks. The questions and answers are provided below.

Round 1 - what causes climate change?

a) Write what you think the pictures show. There may be more than one answer.



Answer: Emissions from agriculture



Answer: Transport



Answer: Imported food or products



Answer: Home energy use



Answer: Fossil fuels



Answer: Deforestation

b) Gases in the Earth's atmosphere, such as carbon dioxide, trap the Sun's heat. By burning fossil fuels, humans increase the amount of gases in the atmosphere, speeding up natural climate change. What is this gas-trapping process called?

Answer: Greenhouse effect

c) What gas do cows emit that can affect the climate?

Answer: Methane

d) List three things you use or do on a daily basis that might contribute to climate change, and explain how they contribute.

Round 2 - how does climate change affect the ocean ecosystem? Write what you think the pictures show. There may be more than one answer.



Answer: Sea temperature rise; glaciers melting; ice melting



Answer: Sea temperature rise; decrease in food availability for marine animals; increase in competition for food



Answer: Flooding; habitat destruction; sea level rise; extreme weather events



Answer: Increase in island pest populations



H *continued...* Homework: climate change quiz

Round 3 - solutions to climate change

a) Give one example of an ecosystem on land and one example of a marine ecosystem that absorbs CO₂ through photosynthesis, therefore naturally helping to reduce climate change.

Answer: Forests; Seagrass meadows

b) Give 1 to 3 solutions to each of these causes of climate change:

DRIVING TO SCHOOL

Answer: carsharing; walking; cycling; taking public transport

TAKING AN AEROPLANE TO GO ON HOLIDAY

Answer: choosing closer holiday destinations; taking a bus; taking a train

DEFORESTATION

Answer: plant a tree; buy sustainable products

FOOD IMPORTS FROM OTHER COUNTRIES

Answer: buy local food; grow your own food

FOSSIL FUEL EMISSIONS

Answer: wind farms; solar panels; send a letter to a politician; buy sustainable products; reduce personal carbon footprint

HOME ENERGY USE

Answer: turn off lights; buy energy-efficient products

N.B. The answers provided for Round 3 are just suggestions - the students may think of their own original ideas.