



Learn with Tayo: Marine Biology

Answer Booklet for Parents

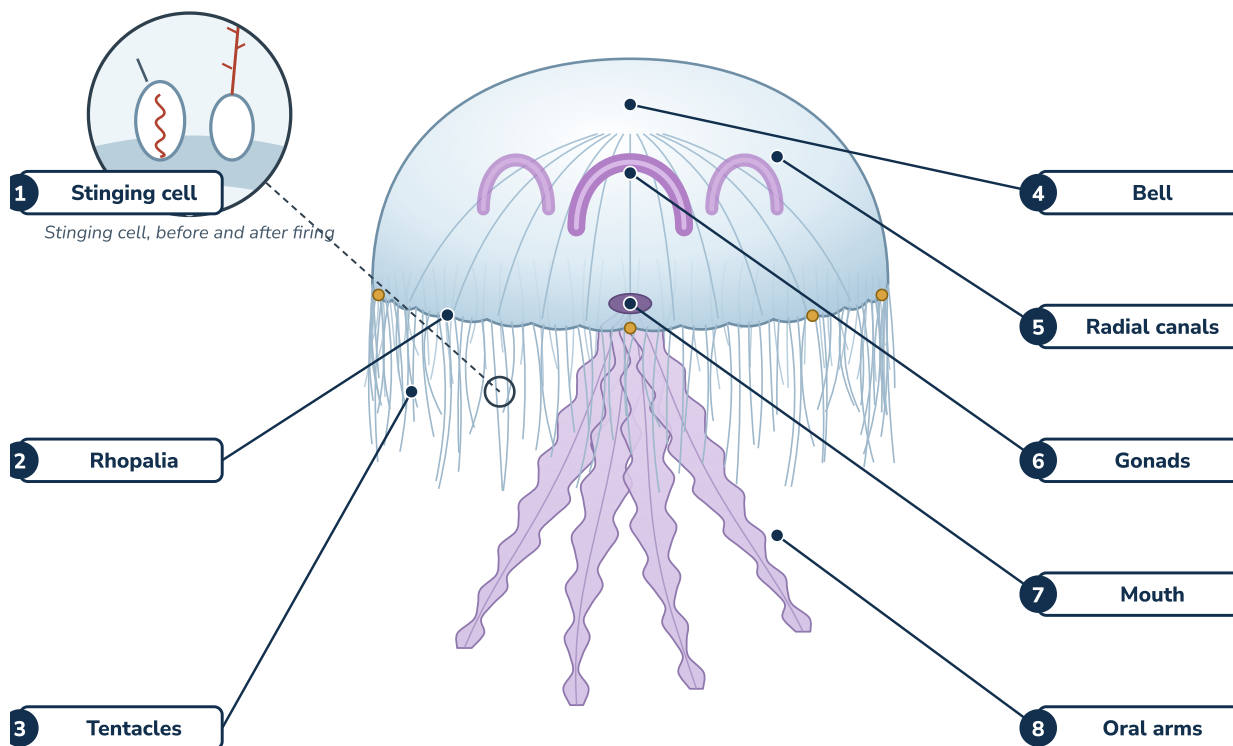
Answer keys for all eight module worksheets. Keep this booklet away from learners until they have finished each worksheet.

1. Module 1: Meet the Ocean (moon jellyfish)
2. Module 2: Ocean Zones and the Seabed (octopus)
3. Module 3: Waves, Tides and Currents (barnacle and limpet)
4. Module 4: Coral Reefs (coral polyp)
5. Module 5: Other Ocean Habitats (kelp forest)
6. Module 6: Fish and Sharks (cod)
7. Module 7: Marine Mammals and Reptiles (dolphin)
8. Module 8: Food Webs, People and the Future (food web)

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The Moon Jellyfish

Answer Key



Functions of Each Part	
Part	Function
Bell	Squeezes and relaxes to push the jellyfish through the water. Protects the body.
Gonads	Make eggs or sperm for reproduction.
Radial canals	Carry digested food from the stomach out across the bell.
Rhopalia	Sense light and gravity so the bell beats evenly and the jellyfish stays upright.
Tentacles	Catch plankton using stinging cells.
Oral arms	Pass food from the bell's edge to the mouth.
Mouth	Takes in food and gets rid of waste (there is only one opening).

Life cycle: adult medusa, eggs and larvae, polyp fixed on rock, ephyra, adult. The polyp stage can bud off many ephyrae, so one larva can become many jellyfish.

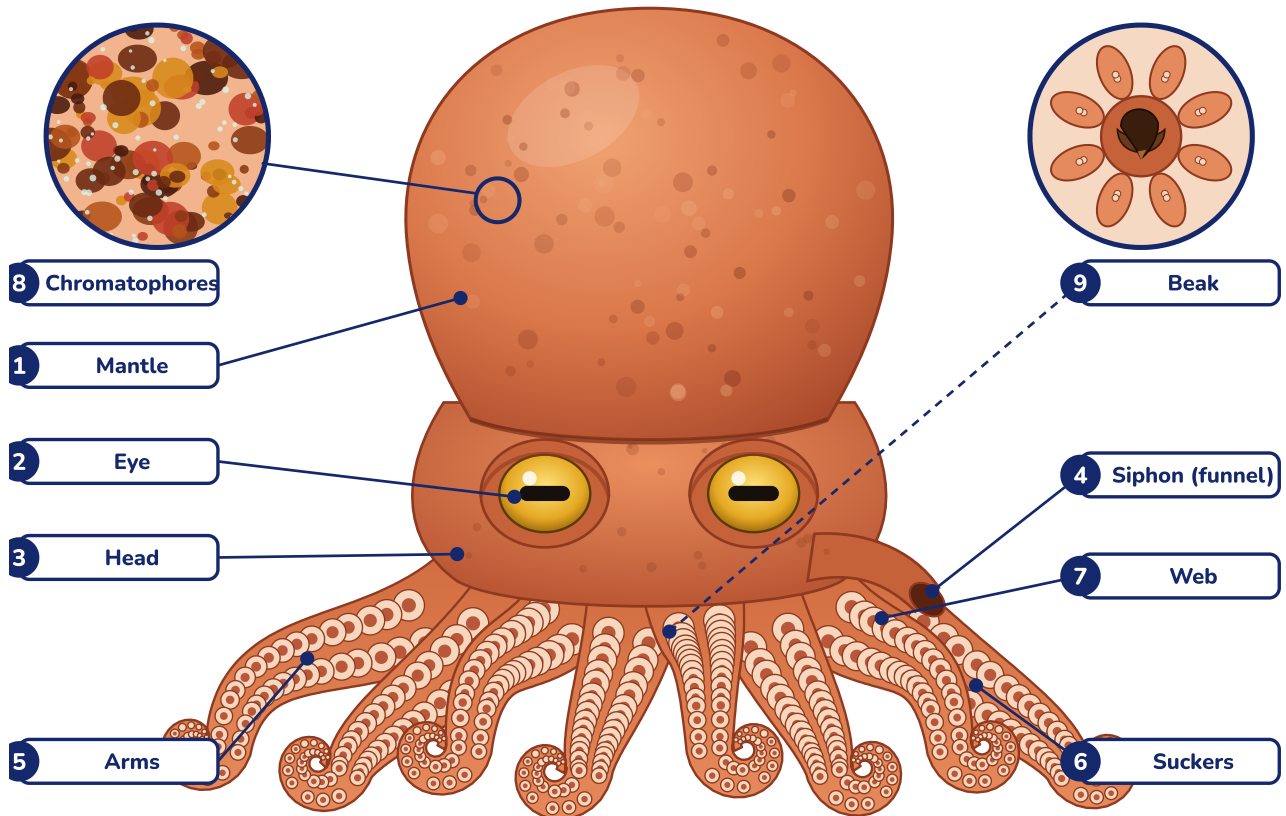
Suggested Answers

1. A cnidarian. Others in the group: corals, sea anemones, other jellyfish such as the lion's mane.
2. It squeezes its bell to push water out, then relaxes it to refill. This pulsing pushes it slowly forward, but mostly it drifts with the currents.
3. Plankton touch the tentacles. Stinging cells fire tiny threads that stun and hold the prey. The oral arms pass the food to the mouth.
4. It takes in food and gets rid of waste.
5. It is about 95% water and has no bones or skeleton; the water supports its body. Out of water there is nothing to hold its shape.
6. Any sensible reason: overfishing removes fish that compete with jellyfish or eat them; warmer water; pollution that lowers oxygen. Any problem: blocking power-station water intakes, stinging swimmers, eating fish eggs and larvae, harming fish farms.

For ages 8 to 11, questions 1 to 5 are enough. The Stretch question is for ages 12 to 15. Accept any answer that shows the same idea in the child's own words.

The Common Octopus

Answer Key



Functions of Each Part	
Part	Function
Mantle	Muscular bag that holds the gills, hearts and other organs. Its muscles squeeze to push water out.
Eyes	Large, sharp eyes with a rectangular pupil. They spot movement and shapes well.
Siphon	Tube that shoots out water for jet propulsion. It also carries ink, waste and fresh water over the gills.
Arms	Eight flexible arms with no bones. They crawl, grab, explore and handle food.
Suckers	Grip surfaces and also taste and feel what they touch.
Chromatophores	Colour sacs in the skin that stretch or shrink to change colour and pattern within a second.
Beak	Hard, parrot-like beak in the centre of the arms. It bites and cuts food.

Inside the mantle: A gill, B digestive gland, C ink sac, D heart.
There are three hearts in total: one systemic heart in the centre and one branchial heart at the base of each gill.

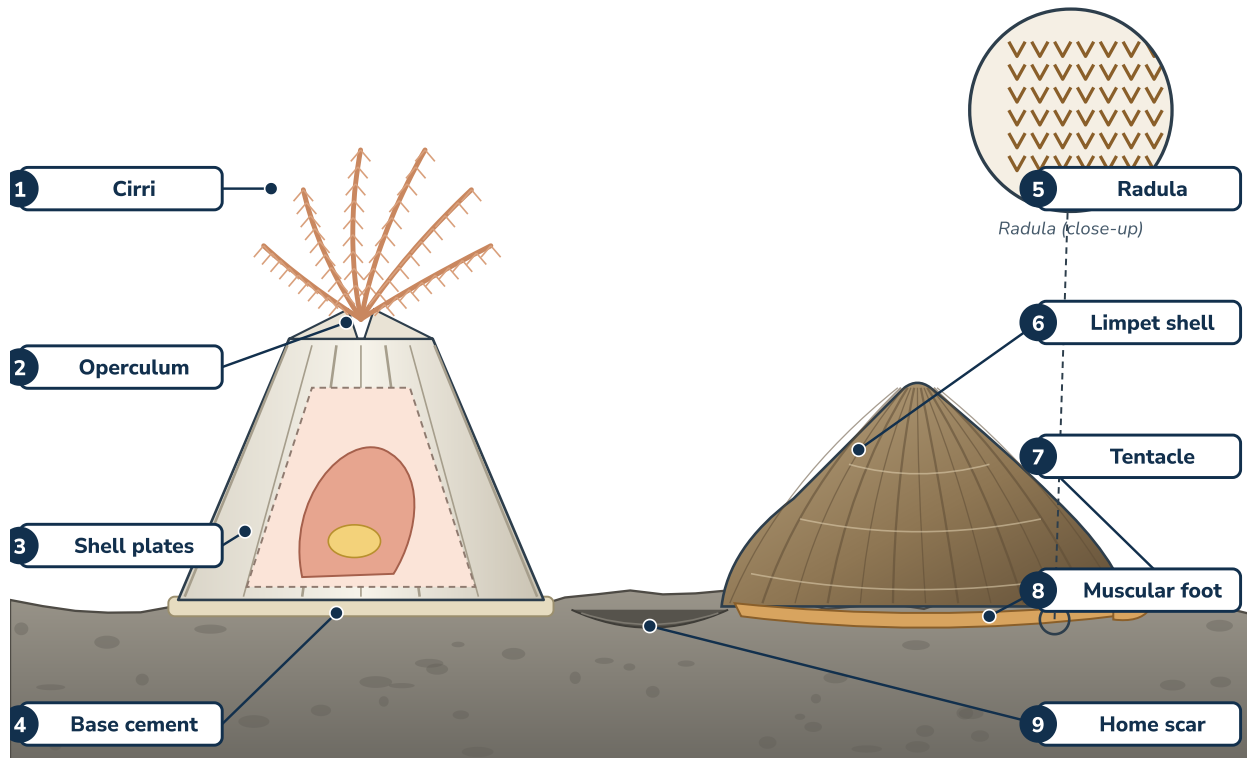
Suggested answers

1. Directly on the head. Cephalopod means head-foot, because the arms (the foot) grow straight from the head.
2. Two branchial hearts push blood through the gills to collect oxygen. The systemic heart then pumps oxygen-rich blood around the rest of the body. Three hearts help it supply a very active body.
3. Any two: jet away by squirting water from the siphon; release a cloud of ink; change colour to blend in (camouflage); squeeze into a narrow crevice; drop an arm and regrow it.
4. Advantage: it can squeeze through any gap as big as its beak, so it can hide in tiny spaces. Risk: no shell or bones to protect it, so it is easy to injure or eat.
5. Any two: less light, colder water, much higher pressure, less food. (Pressure rises by about 1 atmosphere every 10 m.)
6. Each arm can work semi-independently: it can sense and react (for example grip, taste or explore) with some control of its own, while the brain gives overall direction.

Marking note. Accept any answer that shows the idea. For ages 8 to 10, questions 1 to 5 are enough; question 6 is a stretch task for older learners.

Barnacle and Limpet

Answer Key



Functions of Each Part	
Part	Function
Cirri	Feathery legs that sweep plankton from the water into the barnacle's mouth.
Shell plates	A hard wall that protects the barnacle from waves, predators and drying out.
Operculum	Lid plates that open to feed and shut tight at low tide to keep water in.
Base cement	Natural glue that fixes the barnacle to the rock for life.
Limpet shell	A cone that sheds waves and protects the soft body.
Muscular foot	Clamps onto the rock and lets the limpet creep along.
Radula	A tongue with rows of hard teeth for scraping algae off rock.

Where on the shore: both live on the upper and middle shore. They are uncovered twice a day, so they must survive drying out. Ann's shore crab sheet (also Module 3) covers an animal from the middle and lower shore.

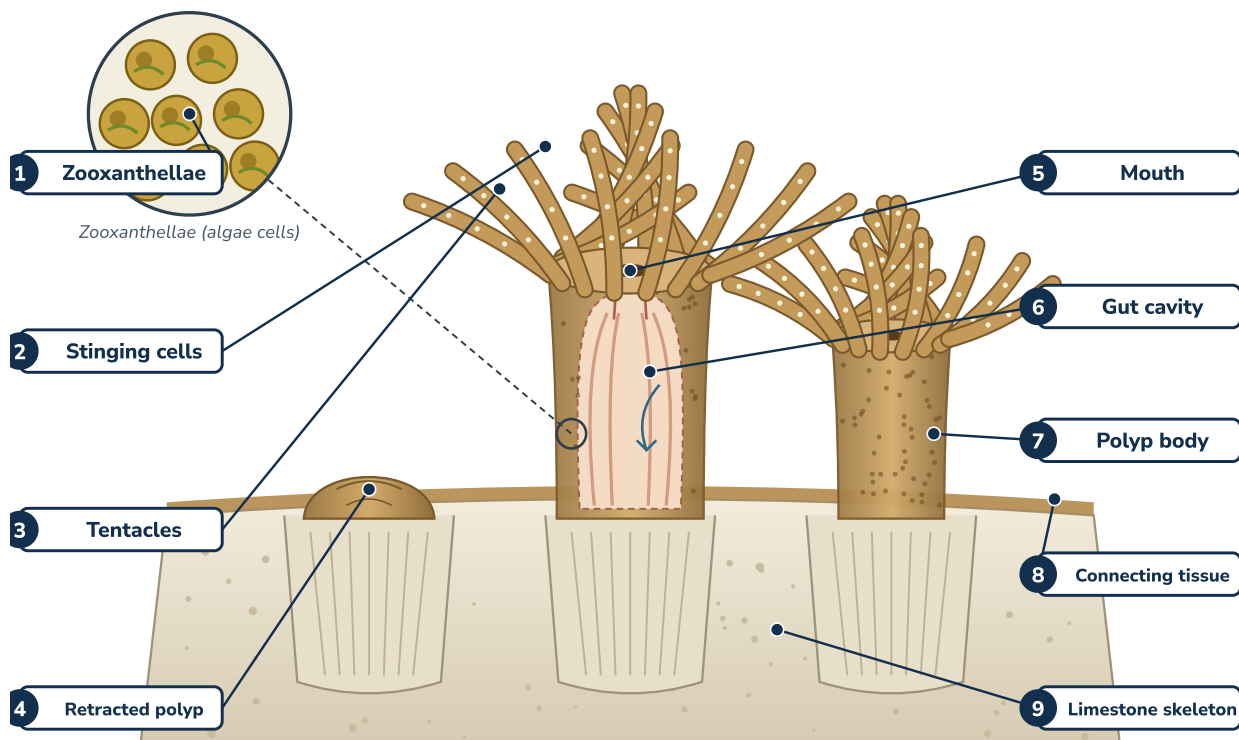
Suggested Answers

1. Barnacle: crustacean (related to crabs). Limpet: mollusc (related to snails).
2. The operculum opens and the feathery cirri reach out and sweep through the water, catching plankton and pulling it into the mouth.
3. It closes the operculum tightly, trapping sea water inside. This stops it drying out in the air and sun, and protects it from predators.
4. A dip in the rock that the limpet's shell has worn to fit exactly. The limpet returns to it and clamps down, making a tight seal that keeps water in and makes it very hard to prise off.
5. Barnacle: dog whelk (or starfish, some fish). Limpet: oystercatcher (or gulls, crabs, starfish).
6. The low, wide cone lets waves flow over it rather than push it, and the wide base spreads the grip of the foot. Water pressure from a wave pushes the shell down onto the rock rather than lifting it.

For ages 8 to 11, questions 1 to 5 are enough. The Stretch question is for ages 12 to 15. Accept any answer that shows the same idea in the child's own words.

Coral Polyp

Answer Key



Functions of Each Part	
Part	Function
Tentacles	Catch plankton and pass it to the mouth.
Stinging cells	Fire tiny harpoons to stun prey.
Mouth	Takes in food and gets rid of waste.
Gut cavity	Digests food.
Zooxanthellae	Make sugars from sunlight and share them with the coral.
Limestone skeleton	A hard cup that supports and protects the polyp.
Connecting tissue	Joins polyps so the colony can share food.

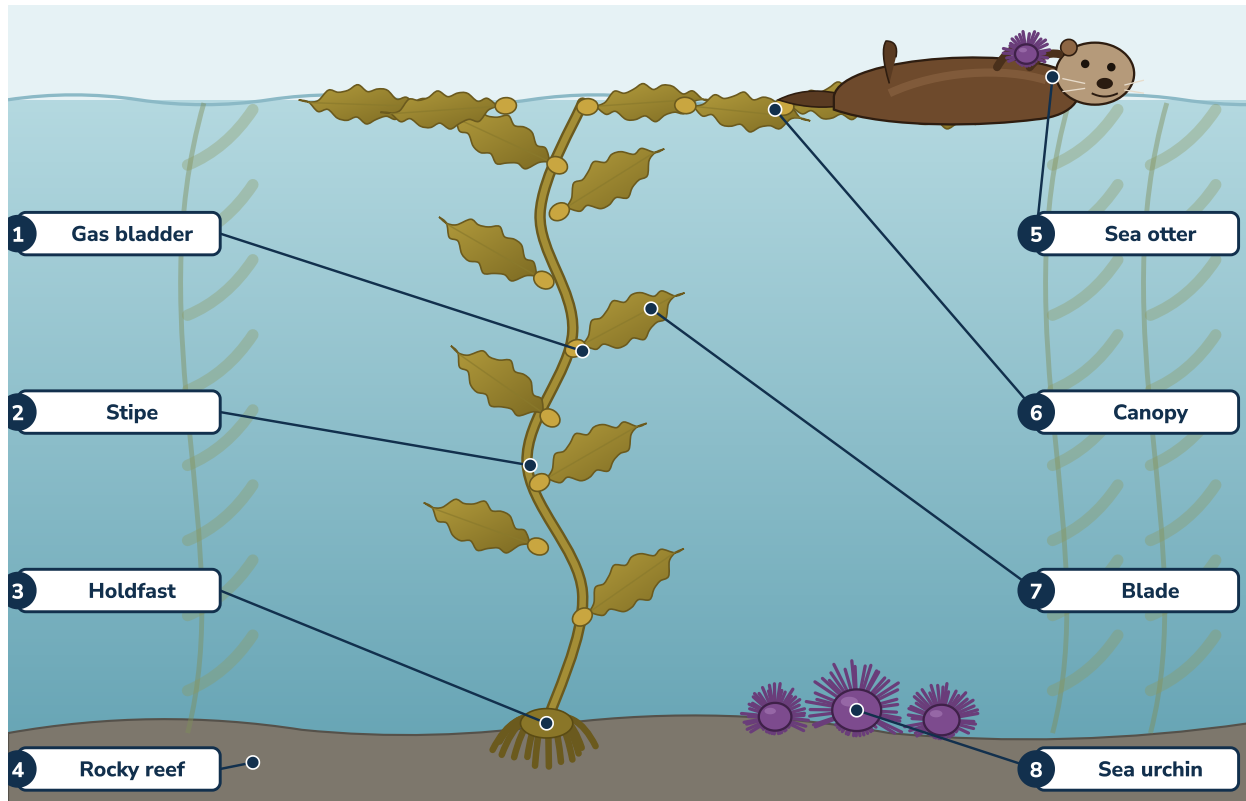
Suggested Answers

1. An animal (a colony of polyps related to jellyfish). It builds a rock-like limestone skeleton and contains plant-like algae, but the coral itself is an animal.
2. It stretches out its tentacles. Stinging cells fire at passing plankton, and the tentacles pass the food to the mouth.
3. Zooxanthellae give sugars and oxygen from photosynthesis (and colour). Coral gives shelter, carbon dioxide and nutrients.
4. Any two: warm water (23 to 29 °C), shallow, clear (sunlit), salty water, a hard surface to grow on.
5. The coral pushes out its zooxanthellae and turns white. It is mainly caused by water being too warm for several weeks.
6. Mud blocks sunlight, so the zooxanthellae cannot photosynthesise. The coral gets most of its food from them, so plankton alone is not enough.

For ages 8 to 11, questions 1 to 5 are enough. The Stretch question is for ages 12 to 15. Accept any answer that shows the same idea in the child's own words.

Kelp Forest

Answer Key



Functions of Each Part	
Part	Function
Holdfast	Grips the rock so the kelp is not washed away.
Stipe	A strong, flexible stem that bends with waves.
Blade	Leaf-like part that absorbs sunlight and nutrients.
Gas bladder	Floats the blades up towards the light.
Canopy	Blades spread at the surface to catch the most sunlight.
Sea urchin	Grazes on kelp.
Sea otter	Eats urchins, keeping the forest healthy.

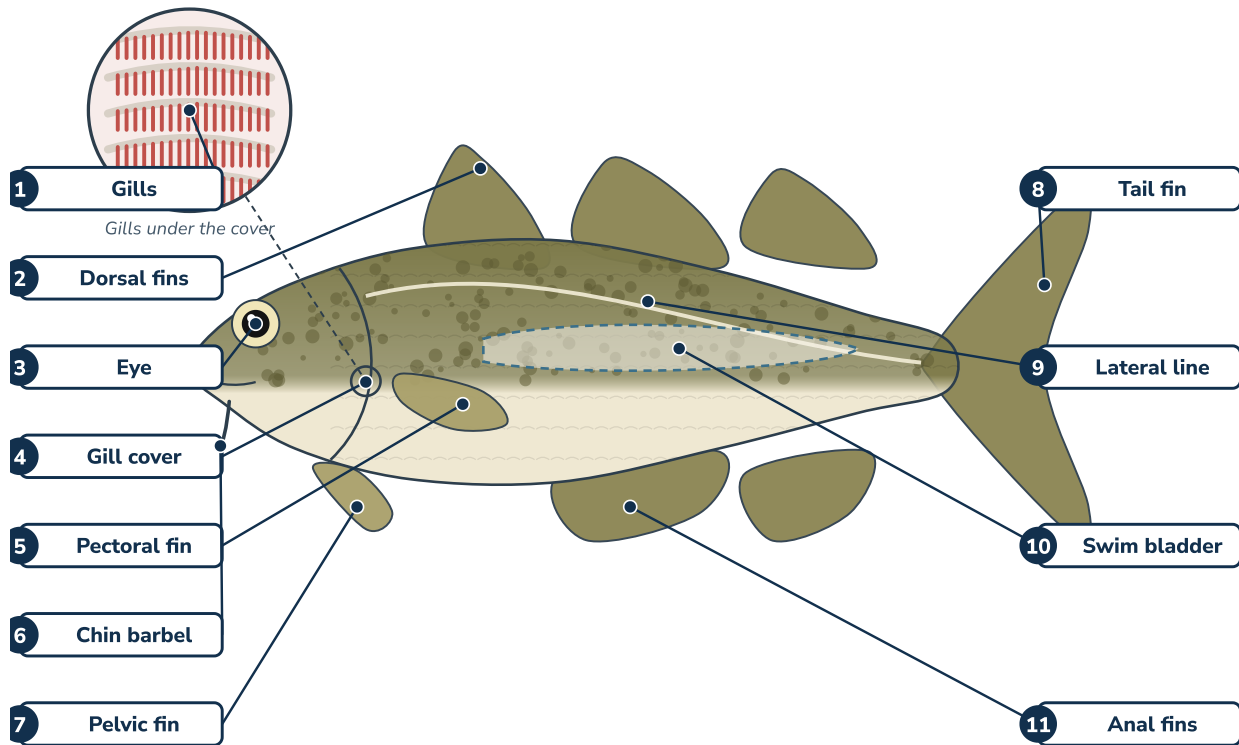
Suggested Answers

1. Roots (also flowers or seeds).
2. The bladders are filled with gas so they float, lifting the blades up towards the sunlit surface, where they can photosynthesise.
3. Kelp needs sunlight for photosynthesis. In deep or muddy water, not enough light reaches the blades.
4. Kelp → sea urchin → sea otter.
5. Urchin numbers would grow because nothing eats them. They would eat through the holdfasts and destroy the kelp, leaving bare urchin barrens. Many animals would lose their homes.
6. Any two: tall 'trees' forming a canopy; layers of habitat from floor to canopy; home to many species; produce oxygen and store carbon; shelter young animals.

For ages 8 to 11, questions 1 to 5 are enough. The Stretch question is for ages 12 to 15. Accept any answer that shows the same idea in the child's own words.

Atlantic Cod

Answer Key



Functions of Each Part	
Part	Function
Gills	Take oxygen from the water into the blood.
Gill cover	Protects the delicate gills.
Swim bladder	Gas-filled bag that controls buoyancy.
Lateral line	Senses vibrations and movement in the water.
Chin barbel	Tastes and feels for food on the sea floor.
Dorsal fins	Keep the fish upright and stable.
Tail fin	Pushes the fish forward.

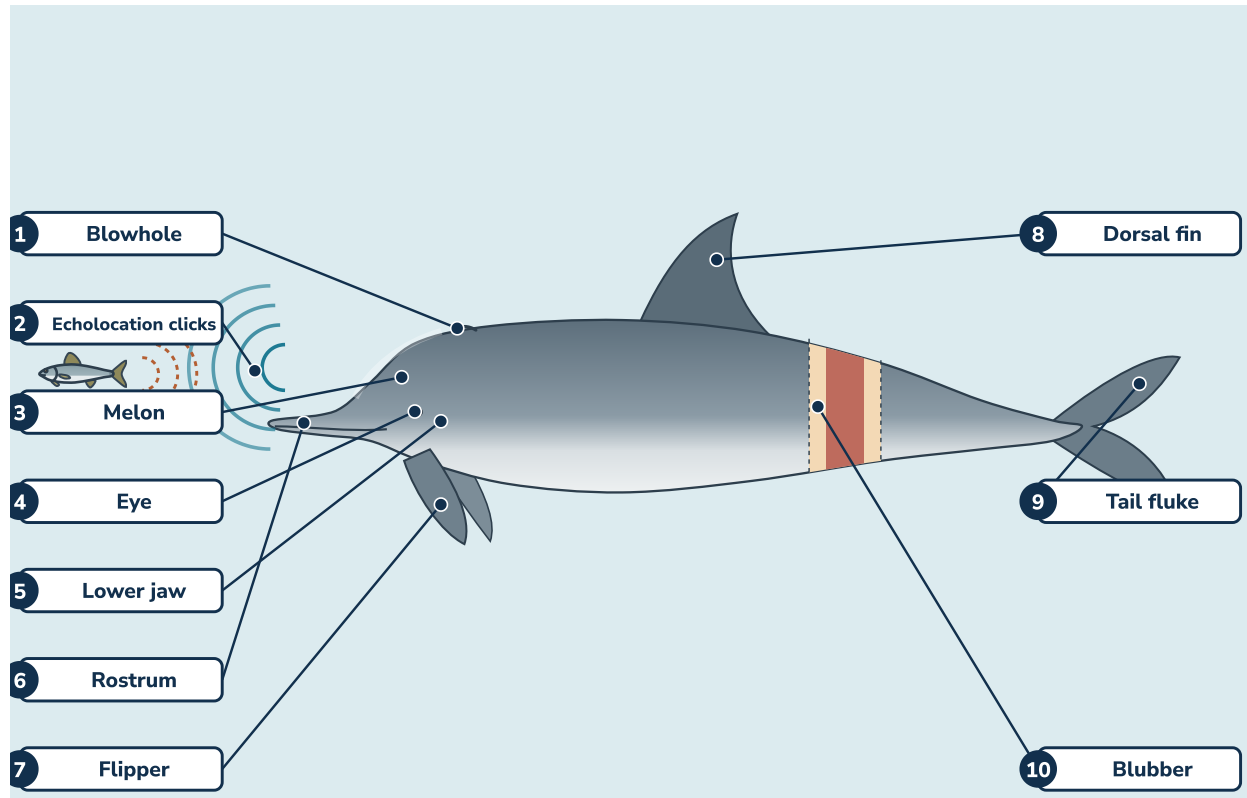
Suggested Answers

1. Bony. Any two: skeleton of bone; gill cover (operculum); swim bladder; smooth scales.
2. Water enters the mouth and flows over the gills. Oxygen passes from the water into blood in the thin gill filaments; carbon dioxide passes out. The water leaves under the gill cover.
3. It is filled with gas. By changing the amount of gas the cod can float at any depth without using energy.
4. It senses movements of water made by nearby fish, so each cod can keep its distance and turn with the shoal, even in the dark.
5. To feel and taste for food (worms, crabs) on or in the sea floor, where it is hard to see.
6. Too many cod were caught, faster than they could breed, especially large breeding adults. Recovery is slow because few adults remain, cod take years to mature, and the food web changed (other species took their place).

For ages 8 to 11, questions 1 to 5 are enough. The Stretch question is for ages 12 to 15. Accept any answer that shows the same idea in the child's own words.

Bottlenose Dolphin

Answer Key



Functions of Each Part	
Part	Function
Blowhole	Lets the dolphin breathe air at the surface; closes underwater.
Melon	Focuses echolocation clicks into a beam.
Lower jaw	Picks up returning echoes and passes them to the ears.
Blubber	Keeps the dolphin warm and stores energy.
Flipper	Steers and helps it stop and turn.
Dorsal fin	Keeps it stable and helps control temperature.
Tail fluke	Moves up and down to push the dolphin forward.

Suggested Answers

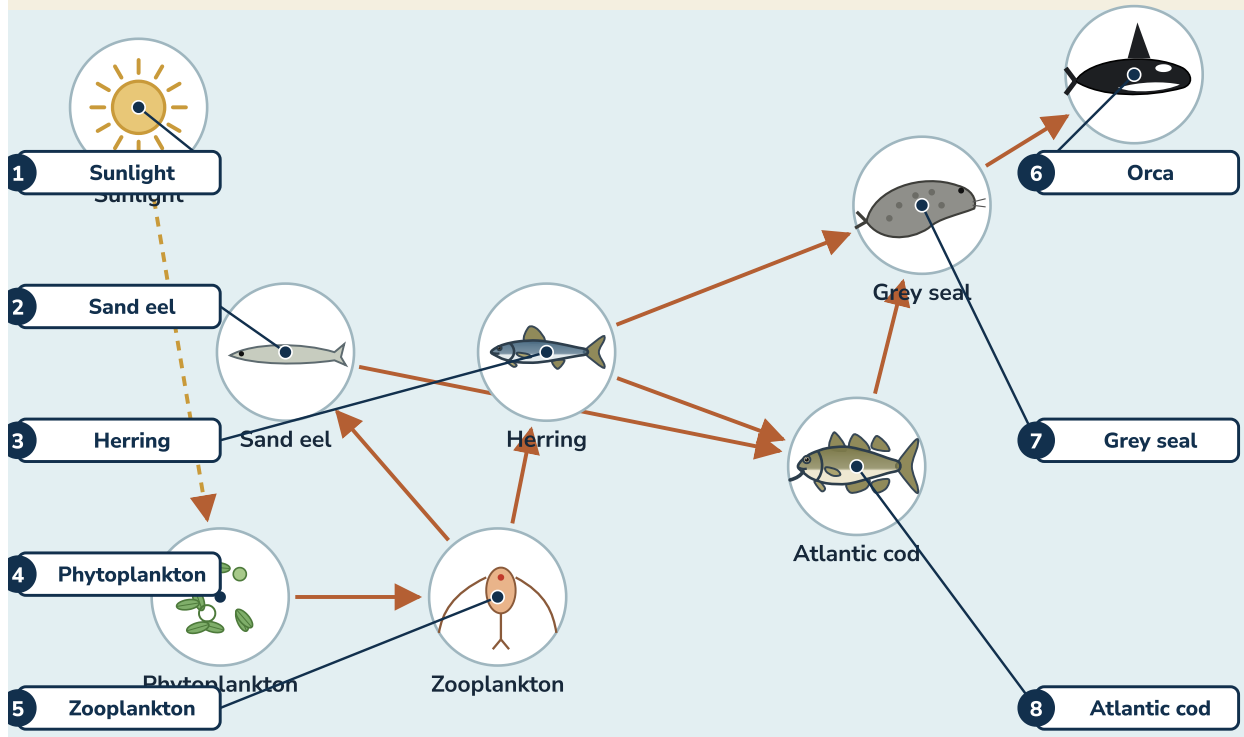
- Any two: it breathes air with lungs; it is warm-blooded; it gives birth to live young; it feeds its calves milk; it has a few hairs at birth.
- It makes clicks, which the melon focuses into a beam. The clicks bounce off the fish and the echoes return. The lower jaw picks them up and passes them to the ears; the brain works out where the fish is and how big it is.
- So it can breathe at the surface while keeping most of its body underwater, without lifting its head out.
- Any two: keeps it warm; stores energy; helps it float; streamlines its shape.
- A dolphin's tail (fluke) is horizontal and moves up and down. A cod's tail is vertical and moves side to side.
- Light cannot get through muddy water, so the dolphin can't see far. Sound travels well through water whatever its colour, so echoes still show where fish are.

For ages 8 to 11, questions 1 to 5 are enough. The Stretch question is for ages 12 to 15. Accept any answer that shows the same idea in the child's own words.

North Atlantic Food Web

Answer Key

Arrows point from the food to the animal that eats it ("is eaten by").



Functions of Each Part

Part	Function
Phytoplankton	Producer: makes food from sunlight.
Zooplankton	Primary consumer: eats phytoplankton.
Sand eel	Eats zooplankton; food for cod, seals and seabirds.
Herring	Eats zooplankton; food for cod and seals.
Atlantic cod	Predator: eats sand eels and herring.
Grey seal	Predator: eats cod and herring.
Orca	Apex predator: eats seals and fish.

What if a link is removed (sand eels): zooplankton may increase (fewer eaten); cod lose a main food and may decline or eat more herring; grey seals have fewer cod and may go hungry. Puffins and other seabirds would also suffer.

Suggested Answers

1. Phytoplankton. It gets energy from sunlight (photosynthesis).
2. For example: phytoplankton → zooplankton → herring → cod → grey seal (any correct chain following the arrows).
3. The orca. Nothing hunts it: it is at the top of the food web.
4. Only about 10% of energy passes up each level, so there is much less energy available at the top to support orcas.
5. Cod would have less food. They might eat more sand eels instead, so sand eel numbers could fall, or cod numbers could drop. Seals that eat cod and herring could also go hungry.
6. Zooplankton eat microplastics; herring or sand eels eat the zooplankton; cod and seals eat those fish; orcas eat seals. The plastic is passed up the web and can build up at each level.

For ages 8 to 11, questions 1 to 5 are enough. The Stretch question is for ages 12 to 15. Accept any answer that shows the same idea in the child's own words.