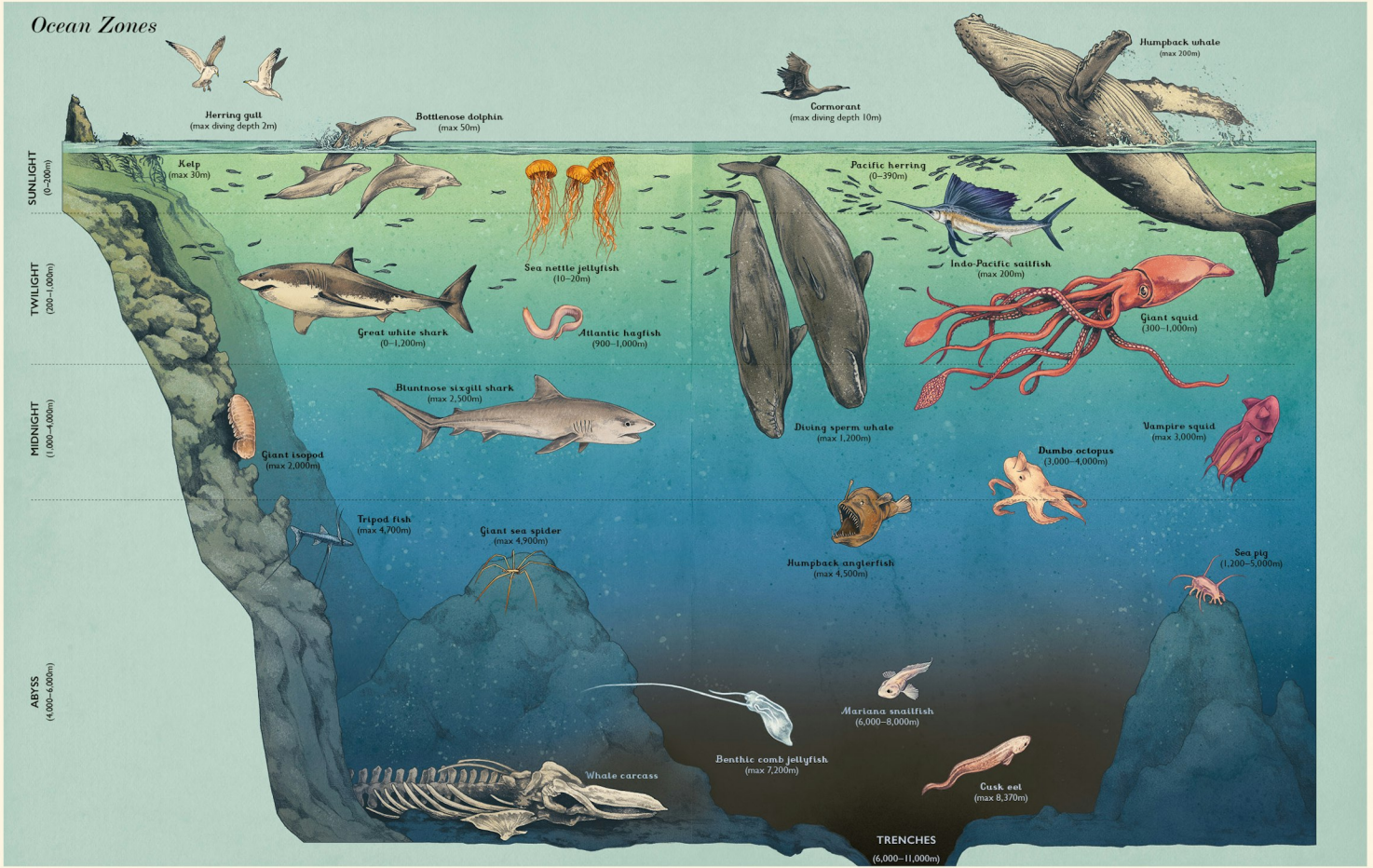
Ocean Zones
SUNLIGHT (0–200m)
TWILIGHT (200–1,000m)
MIDNIGHT (1,000–4,000m)
ABYSS (4,000–6,000m)
Herring gull (max diving depth 2m)
Bottlenose dolphin (max 50m)
Cormorant (max diving depth 10m)
Humpback whale (max 200m)
Kelp (max 30m)
Pacific herring (0–390m)
Sea nettle jellyfish (10–20m)
Indo-Pacific sailfish (max 200m)
Great white shark (0–1,200m)
Atlantic hagfish (900–1,000m)
Giant squid (300–1,000m)
Bluntnose sixgill shark (max 2,500m)
Diving sperm whale (max 1,200m)
Vampire squid (max 3,000m)
Giant isopod (max 2,000m)
Dumbo octopus (3,000–4,000m)
Tripod fish (max 4,700m)
Giant sea spider (max 4,900m)
Humpback anglerfish (max 4,500m)
Sea pig (1,200–5,000m)
Mariana snailfish (6,000–8,000m)
Benthic comb jellyfish (max 7,200m)
Whale carcass
Cusk eel (max 8,370m)
TRENCHES (6,000–11,000m)

OCEANARIUM

Gallery 1

Plankton

Phytoplankton
Zooplankton

Phytoplankton

The ocean is home to some of the smallest and biggest creatures that have ever lived. Among the smallest are plankton – microscopic organisms that drift through the sea, carried by the ocean currents and unable to swim against them. Plankton are so small that most are measured in micrometres (µm) – one centimetre is the equivalent of 10,000 micrometres.

Some plankton behave a little like plants and are known as phytoplankton. Phytoplankton can make their own food via photosynthesis. Because of this they are positioned at the bottom of the ocean food chain. They are vitally important because they support a whole ecosystem, providing food for many ocean animals, from tiny animal plankton to giant whale sharks.

With sunlight encouraging reproduction during the summer months, phytoplankton can occur in large numbers known as blooms. Too much phytoplankton can be damaging however, as harmful algae blooms can decrease oxygen levels and create 'dead zones' where marine animals and plants are unable to survive. This can be caused by fertiliser running off farmland and entering the sea which rapidly increases growth – a reminder that our activities on land can affect the sea.

Key to plate

1: **Dinoflagellate**
Diameter: Up to 200µm
During the day, this dinoflagellate extends its 'fingers' into the water. These contain chloroplasts which are used in photosynthesis.

2: **Cyanobacteria**
Diameter: Approx. 0.6µm
This minuscule plankton is one of the most abundant photosynthetic organisms on Earth. One millilitre of seawater can contain around 100,000 cyanobacteria.

3: **Coccolithophore**
Length: Up to 75µm
Coccolithophores are covered in chalky discs which reflect sunlight. When this phytoplankton blooms, the reflection is visible to satellites in space!

4: **Diatom**
Length: Up to 300µm
This diatom is a tiny, single-celled algae that makes its body out of glass-like silica – meaning it effectively lives in a glasshouse.

5: ***Chaetoceros debilis***
Length: Up to 20µm
These microscopic algae join together to form long, spiral-shaped chains.

6: **Sea sparkle**
Diameter: Up to 2,000µm
This species makes light via bioluminescence – a chemical reaction – when disturbed, producing an amazing blue-green glow.

Zooplankton

Some zooplankton are the larvae of animals, and will grow and eventually mature into crabs, fish and other sea creatures. Others, such as copepods, will remain tiny organisms their whole lives. Floating by the thousands in every drop of water on the ocean's surface, zooplankton and phytoplankton form a life-filled 'soup' which will ultimately feed almost every other animal in the ocean.

Both phytoplankton and zooplankton play an important role in ocean food chains. While phytoplankton use the sun's energy to make food, zooplankton provide the link between phytoplankton and larger sea creatures. Some are herbivores and graze directly on phytoplankton, while others are predators and hunt for smaller zooplankton. Many are eaten by larger animals. Amazingly, blue whales can consume as much as four tonnes of krill in a single day.

Despite their minute size, zooplankton travel from the ocean's surface to the murky depths and back again every day. This is called vertical migration and it allows them to feed on phytoplankton at the surface at night, avoiding predators that hunt there during the day. With so many of these animals completing a daily round trip of around 2,000 metres, it is one of the largest migration events on Earth.

Key to plate

1: **Sea butterfly**
Shell width: Up to 6mm
This tiny snail provides the main food source for a type of sea slug called the sea angel.

2: **Polychaete worm**
Length: Up to 50mm
There are 10,000 species of these marine worms, also known as sea mice and feather duster worms.

3: **Starfish larvae**
Length: Approx. 1mm
These larvae eventually get too heavy and sink to the seabed.

4: **Copepod**
Length: Up to 5.5mm
There are around 13,000 species of copepod.

5: **Green shore crab larvae**
Length: Up to 4mm
These larvae move in sync with the tides in order to reach deeper coastal waters.

6: **Swordfish larvae**
Length: 4mm
An adult swordfish can be 3m long and a fearsome predator.

7: **Sunfish larvae**
Length: Approx. 2mm
An adult sunfish can grow to nearly 2m, meaning there's a big size difference between larvae and adult. Huge, flat and circular, a sunfish looks a bit like a swimming head!

8: **Antarctic krill**
Length: Up to 6cm
By weight, krill are likely to be the most abundant animals on Earth.