



## polar bear

Polar bears are warm blooded and spend much of their lives on sea ice. They grow to 3m in length, have thick fur to keep warm and long muzzles (noses) that warm up the cold air they breathe into their lungs. In autumn, female polar bears dig dens in which they give birth to two cubs between November and February. The family stay inside the den until the spring, with the female nursing the cubs.



## emperor penguin

Emperor penguins are warm blooded, aquatic animals. Although they are aquatic, emperor penguins cannot breathe underwater. They dive to catch their food and hold their breath for up to 20 minutes. Emperor penguins are covered with feathers that keep them warm and also repel water. Each year, female emperor penguins lay one egg, then return to the ocean to feed. The male penguin incubates the egg throughout winter in a brood pouch just above his feet. The male penguins also stand in large huddles to keep warm. When the females return from feeding months later, they feed the newly hatched chicks with regurgitated fish.





## Siberian salamander

Siberian salamanders live in the Arctic Circle. They have thin, permeable skin that produces mucus to keep them moist. Salamanders reproduce in the summer months. The females lay an average of 50 eggs in ponds, then leave and do not care for their offspring. The eggs hatch after one month and the newly hatched larvae live in water and breathe using gills. The larvae become adults during metamorphosis, developing limbs, a long tail and lungs to breathe air. The adult salamanders do not live in water. Siberian salamanders are cold blooded and survive extreme winter temperatures by hibernating under the ice.



## Greenland shark

The cold blooded Greenland shark is found in the north Atlantic and Arctic Oceans. They live at depths of approximately 2000m, where the water is at its coldest. They can grow to a length of 6.4m and are covered in rough scales. Unusually, female Greenland sharks give birth to around 10 live young in each litter, rather than laying eggs. When the young sharks are born, they are completely independent.





## common lizard

Common lizards live throughout central and northern Europe. They grow between 10cm and 15cm in length, are cold blooded and have coarse, dry, scaly skin. Lizards typically lay eggs, however common lizards incubate their eggs inside their bodies and give birth to live young. This is an adaptation due to cold conditions, with the independent young lizards being born in the warmer summer months, increasing their chance of survival. Common lizards hibernate in winter. During this time their breathing rate drops with some not breathing at all.



## emerald rockcod

The emerald rockcod is found in the cold waters of the Southern Ocean. They are covered in brown scales and breathe using gills. Emerald rockcod reproduce in the summer, with females laying and attaching their eggs to rocks, seaweed or sponges on or near the bottom of the ocean. The eggs hatch six to twelve months later. The newly hatched larvae live on plankton for six to nine months until they become adults. The cold blooded, emerald rockcod produce a chemical inside their bodies that stop them from freezing in the cold conditions.





## walrus

Walrus live in the Atlantic and Pacific Oceans of the Arctic region. They are warm blooded and have thick, blubbery skin. Walrus reproduce in the spring and females give birth to one live young around 15 months later. Calves can weigh up to 75kg and are nursed by their mothers for over a year. Walrus feed in shallow waters near the coast and migrate with the moving ice floes. When swimming and diving for food, walrus hold their breathe. The muscles in their throats also close their windpipe, which prevents water from entering their lungs.



## Arctic tern

Arctic terns are found in coastal areas of the Arctic and sub-Arctic regions. They grow to 35cm in length and have pale grey and white feathers, with black feathers on their heads. Arctic terns reproduce in the summer, where pairs mate for life. A female generally lays between one and three eggs, with both parents taking it in turns to sit on the nest. The eggs hatch in just under one month and both parents feed the chicks with fish. Arctic terns fly south to Antarctica for the winter, travelling a round trip of an average of 40,000km.

